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TWENTY-SEVENTH ANNUAL REPORT  
OF THE  
HEALTH DEPARTMENT



OF THE  
CITY OF BOSTON  
1898

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TWENTY-SEVENTH ANNUAL REPORT

OF THE

HEALTH DEPARTMENT

OF THE

CITY OF BOSTON

FOR THE YEAR 1898



BOSTON  
MUNICIPAL PRINTING OFFICE  
1899



## ORGANIZATION OF THE HEALTH DEPARTMENT.

---

SAMUEL H. DURGIN, *Chairman.*

GEORGE F. BABBITT.

EDWIN L. PILSBURY.

---

CHARLES E. DAVIS, JR., *Secretary.*





## TABLE OF CONTENTS.

	PAGE.
Alleyways . . . . .	42
Animals, report of inspector . . . . .	123
Appointments . . . . .	60
Barber, Jacob, report of . . . . .	137
Briggs, F. L., report of . . . . .	136
Buildings, removal of old . . . . .	38
Burr, Dr. Alexander, report of . . . . .	123
Carson, Dr. Paul, report of . . . . .	121
Diphtheria . . . . .	34
Diphtheria, list of culture stations . . . . .	55
Disinfection, work of . . . . .	35
Financial statement . . . . .	61
Garbage and refuse, disposal of . . . . .	40
Gas-fitting . . . . .	40
Glanders and rabies . . . . .	34
Grouse, John C., report of . . . . .	135
Harrington, Dr. Charles, report of . . . . .	131
Hill, Dr. Hibbert W., report of . . . . .	63
Inspector of Provisions, report of . . . . .	134
Laboratory . . . . .	45
Laboratory, report of Dr. Hill . . . . .	63
Lodging-houses . . . . .	40
Lying-in hospitals, list of . . . . .	56
Medical inspector, report of . . . . .	114
Medical inspection of schools . . . . .	53
Milk and vinegar, report of inspector . . . . .	131
Milk supply . . . . .	45
Morgue, report of superintendent of . . . . .	136
Nuisances abated (table) . . . . .	37
Old buildings, removal of . . . . .	38
Passageways . . . . .	42
Peddlers, report of superintendent of . . . . .	137
Plumbers, examination of . . . . .	42
Port physician, report of . . . . .	121
Provisions, report of inspector . . . . .	134
Public baths, transfer of . . . . .	60
Regulations . . . . .	138
Sargent, Dr. Geo. A., report of . . . . .	117
School-houses . . . . .	51
Schools, classification of diseases in . . . . .	52

Schools, medical inspection of . . . . .	51
Shea, Dr. Thomas B., report of . . . . .	114
Tenement-houses . . . . .	39
Undertakers . . . . .	57

## TABLES:

	Comparative view of the twenty-five principal causes of death during the year 1898. . . . .	2
No.	I. Total deaths, still births and zymotic diseases for twenty-eight years . . . . .	3
"	II. Deaths under five years and over five years for twenty-eight years . . . . .	4
"	III. Deaths in 1898 by sex, condition, color, nativity, parentage, and season . . . . .	5
"	IV. Principal zymotic diseases . . . . .	6
"	V. Percentage of deaths by zymotic diseases from 1870-1898 . . . . .	7
"	VI. Ten principal causes of deaths, by sex and month, with nativity of parents . . . . .	8
"	VII. Ten principal causes of death, by age and sex . . . . .	9
"	VIII. Deaths from zymotic diseases, by sex and month, with nativity of parents . . . . .	10
"	IX. Deaths from principal zymotic diseases, by age and sex . . . . .	12
"	X. Number and percentage of deaths, 1865-1898 . . . . .	14
"	XI. Deaths from ten principal causes . . . . .	16
"	XII. Deaths each quarter for 1893-1898, and aggregate and average, 1889-1893 . . . . .	16
"	XIII. Deaths and percentages each quarter, 1898, with aggregate and average for ten years previous . . . . .	16
"	XIV. Parentage of children under one, two and five years, for each month, 1898 . . . . .	17
"	XV. Cases reported and deaths from smallpox, diphtheria, scarlet fever and typhoid fever, with percentages . . . . .	18
"	XVI. Deaths from smallpox, diphtheria, scarlatina, typhoid fever, cholera and typhus fever, 1840-1898, . . . . .	18
"	XVII. Diseases arranged alphabetically . . . . .	19
	Cholera infantum, comparison of deaths for twenty-five years . . . . .	23
	Comparative deaths, American and foreign cities, for a series of years . . . . .	24
Chart No. 1.	Percentage of deaths of children under five years of age, zymotic deaths and five of the principal infectious diseases for twenty-eight years ending 1898, . . . . .	2
Chart No. 2.	Percentage of mortality of four principal causes of deaths for forty-eight years . . . . .	2
Chart No. 3.	Diphtheria . . . . .	2

HEALTH DEPARTMENT, OLD COURT HOUSE,  
BOSTON, February 1, 1899.

HON. JOSIAH QUINCY,

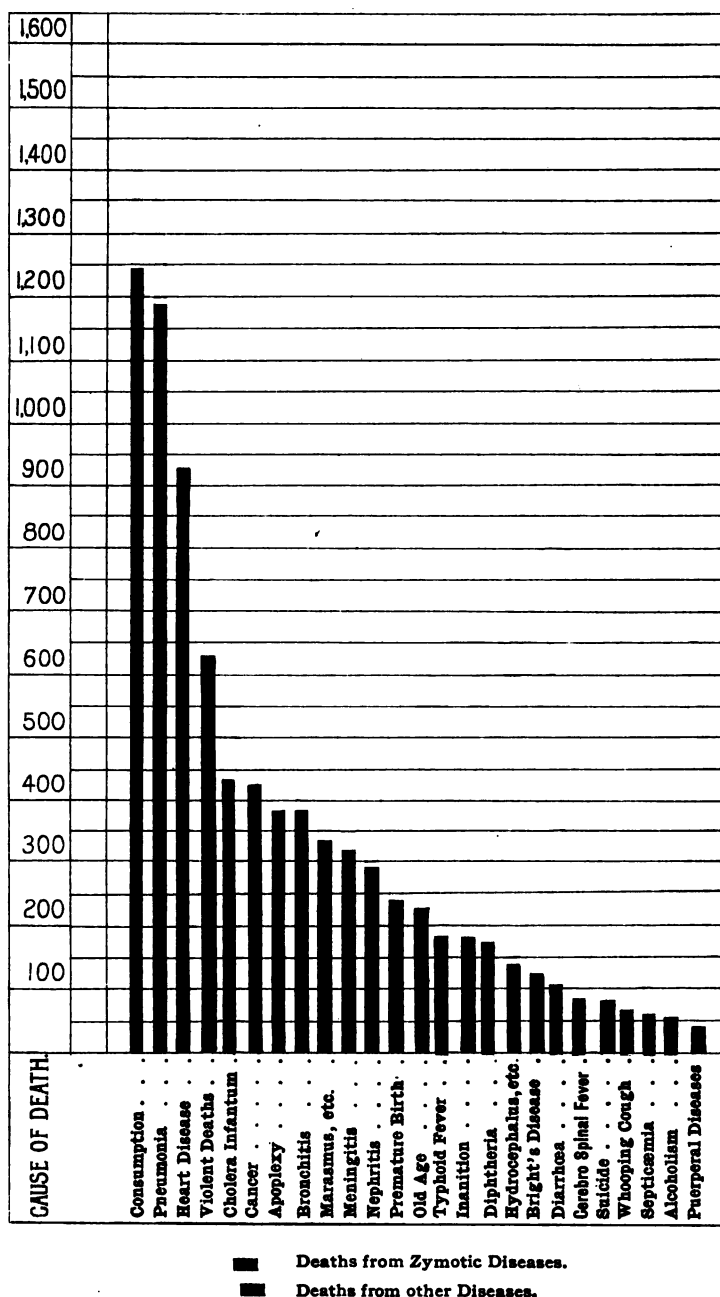
*Mayor of the City of Boston :*

SIR, — The Board of Health respectfully submits its twenty-seventh annual report, covering the work of the Health Department for the past year, together with a statement of the receipts and expenditures of the department from February 1, 1898, to February 1, 1899.

The total number of deaths for the year was 10,886, a decrease from the previous year of 268 deaths. The population, as estimated at the end of the year, is 541,827, which is based on the geometrical rate of increase between the last two census years, 1885–1895. The death-rate for the year, as calculated on this population, is 20.09 per 1,000 inhabitants. This rate is less by .99 than that of the previous year, and the lowest on record. There were 1,470 deaths from zymotic diseases, a decrease of 336 deaths from the same group of the previous year. There were 241 less deaths from diphtheria than in 1897, with a proportionate decrease in the number of cases. The percentage of deaths to the number of cases of diphtheria reported was 10.23 as against 12.09 per cent. the preceding year. There were 33 deaths from scarlatina, 103 less deaths than in the preceding year, and 129 less than the average of the five previous years. Typhoid fever caused 185 deaths during the year. Ninety of the deaths from this cause occurred during the months of August, September and October, and 113 of

the whole number died between the ages of 20 and 40 years. There were 27 deaths from measles during the year. The number of deaths of children under five years of age was 3,577 compared with 3,708 for the previous year, showing a decrease of 131 deaths. The respiratory cases are still the most fatal, causing fully 25 per cent. of the whole mortality the past year, as against 26 per cent. in 1897.

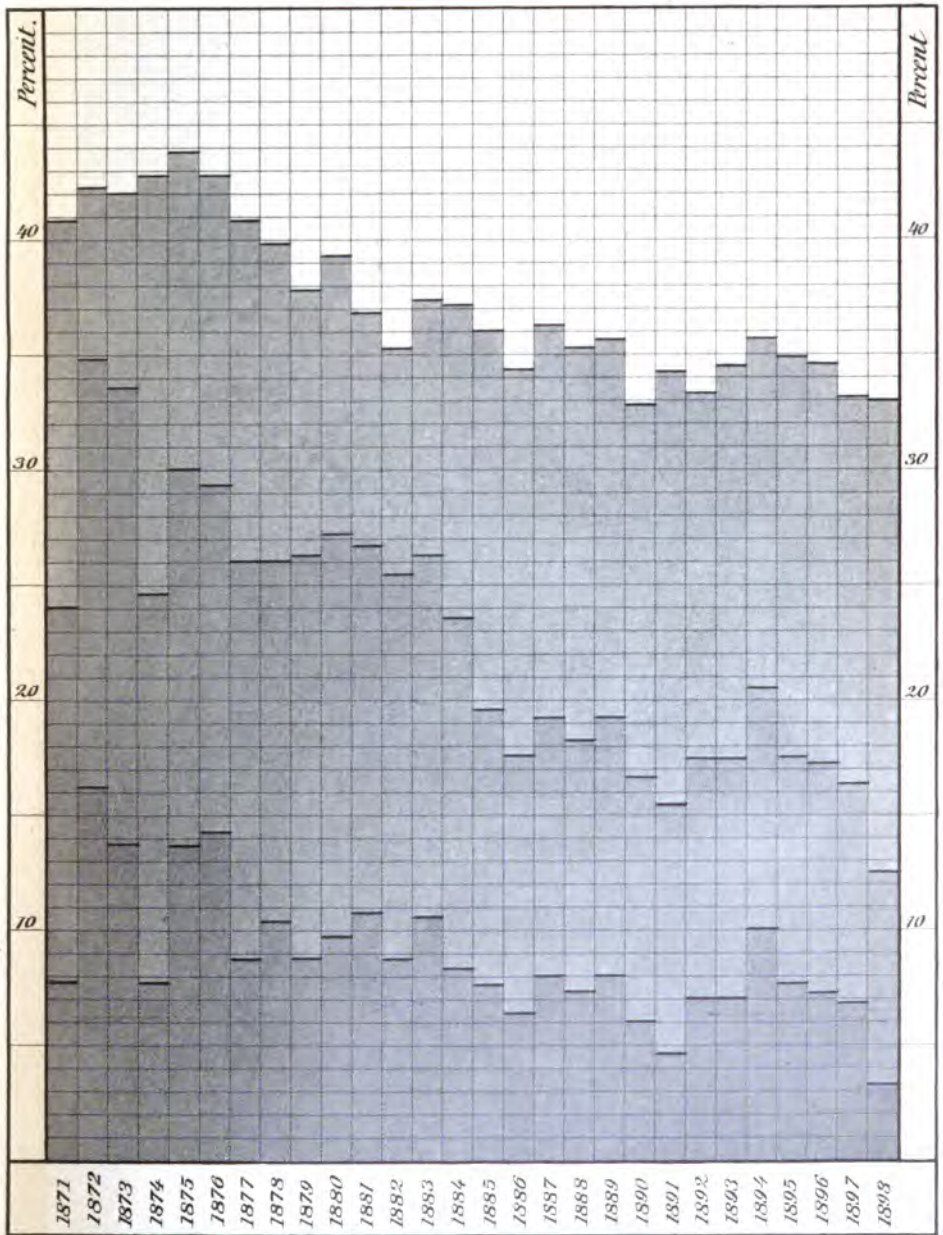
# Comparative View of Twenty-five of the Principal Causes of Death during the Year 1898.





## CHART NO. 2.

Percentage of Deaths of Children under five years of age,  
ZYMOTIC DEATHS, AND FIVE OF THE PRINCIPAL INFECTIOUS DISEASES  
to the total mortality for twenty-eight years ending 1898



Percentage of Children under five years of age to total mortality . . . . .  
 “ of Zymotic deaths to total mortality . . . . .  
 “ of Diphtheria, Scarlet Fever, Measles, Typhoid Fever,  
 and Small-Pox to total mortality . . . . .



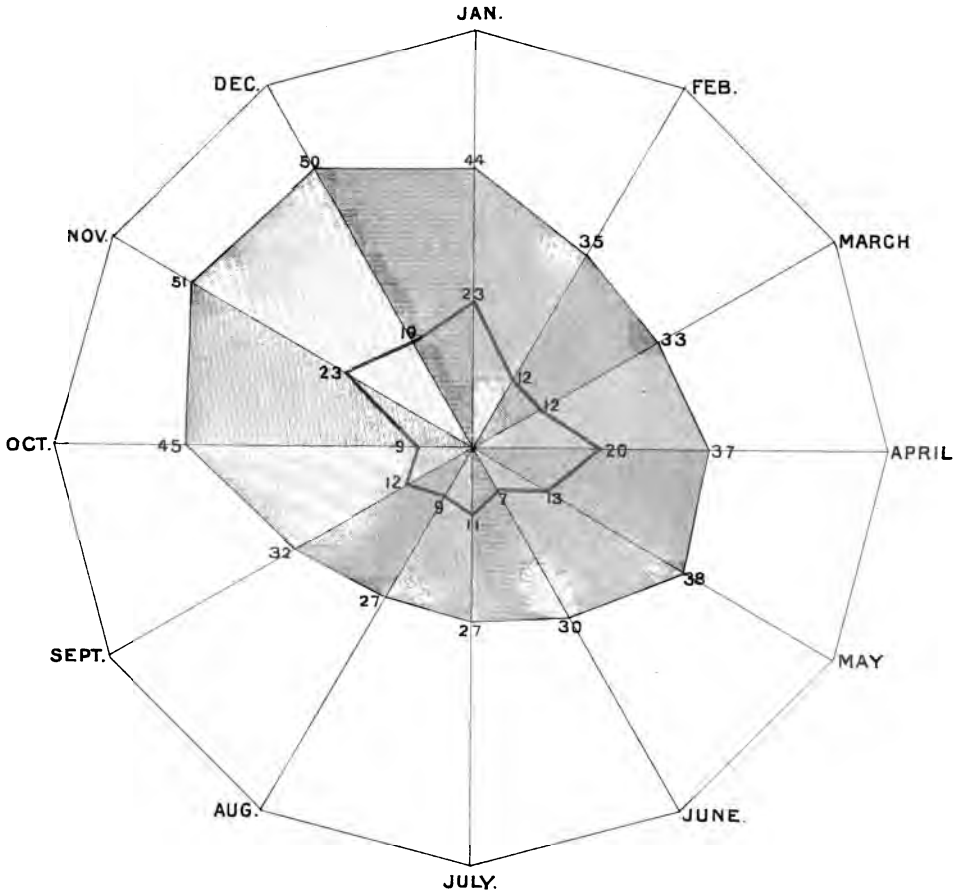






# CHART NO. 4.

## DIPHTHERIA.

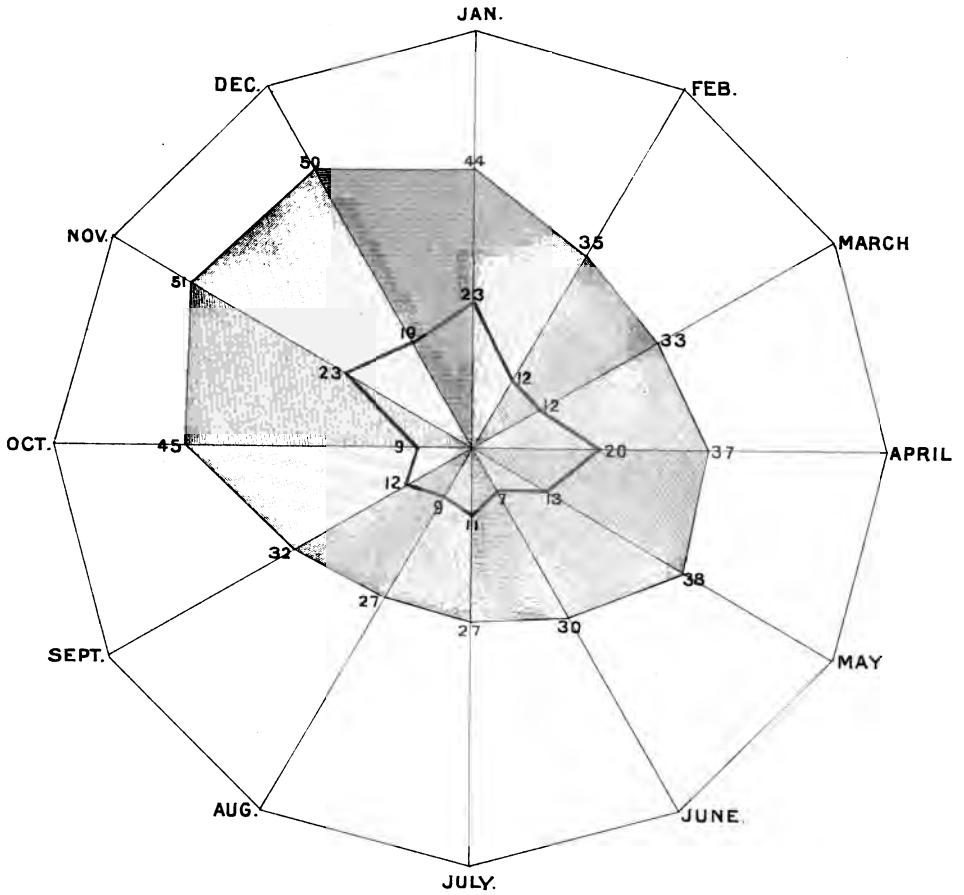


— Average deaths per month for ten years 1889-1898.  
 — Deaths per month for the year 1898.



# CHART NO. 4.

## DIPHTHERIA.



— Average deaths per month for ten years 1889-1898.  
 — Deaths per month for the year 1898.



**Table I. — Total of Deaths, Still-births and Deaths from Zymotic Diseases, for Twenty-eight years, with Percentages.**

YEARS.	Total Deaths, exclusive of still-births.	Still-births.	Total Zymot- ics.	Diphtheria and Croup.	Scarlet Fever.	Typhoid Fever.	Cerebro-spinal Meningitis.	Whooping- cough.	Measles.	Diarrhoeal Diseases.	Small-pox.	Percentage of Zymotic Deaths to to- tal Mortality.	Rate of Still- births per 1,000 Inhab- itants.
1871 .....	5,888	543	1,408	128	111	176	3	30	9	756	23	23.91	1.88
1872 .....	8,090	560	2,523	94	258	229	60	52	60	1,006	738	34.89	1.91
1873 .....	7,969	515	2,626	119	474	243	216	33	16	925	302	33.37	1.76
1874 .....	7,812	642	1,899	121	269	202	35	108	41	940	2	24.30	2.19
1875 .....	9,060	541	2,722	631	534	227	41	41	65	989	1	30.02	1.28
1876 .....	8,253	485	2,439	720	458	145	13	59	2	827	2	29.55	1.41
1877 .....	7,316	471	1,890	471	104	156	24	88	2	913	4	25.83	1.37
1878 .....	7,636	441	1,980	569	68	120	19	88	145	816	....	25.91	1.28
1879 .....	7,398	453	1,935	545	149	119	15	112	2	772	....	26.16	1.24
1880 .....	8,531	443	2,321	774	33	154	8	94	49	1,003	1	27.20	1.22
1881 .....	9,016	513	2,423	802	35	207	16	77	108	870	6	26.87	1.29
1882 .....	8,995	518	2,276	575	75	212	24	92	25	951	8	25.30	1.26
1883 .....	9,740	504	2,551	608	211	198	23	31	152	1,023	1	26.19	1.17
1884 .....	9,622	503	2,278	487	209	216	26	181	13	855	1	23.67	1.17
1885 .....	9,618	520	1,879	450	156	152	19	26	84	723	2	19.53	1.30
1886 .....	9,268	543	1,644	423	81	135	14	37	36	705	....	17.73	1.35
1887 .....	10,073	534	1,993	410	195	183	16	82	119	734	....	19.70	1.33
1888 .....	10,197	552	1,841	589	66	170	19	74	27	669	2	18.05	1.33
1889 .....	10,259	598	1,968	683	23	186	21	96	48	710	2	19.18	1.42
1890 .....	10,181	627	1,677	462	42	155	17	39	19	665	....	16.47	1.39
1891 .....	10,571	614	1,615	285	64	154	21	39	21	755	....	15.27	1.33
1892 .....	11,236	633	2,014	481	262	137	12	45	19	693	....	17.92	1.34
1893 .....	11,710	605	2,042	546	248	148	15	40	27	635	....	17.43	1.24
1894 .....	11,520	700	2,357	878	192	141	18	111	8	700	22	20.46	1.39
1895 .....	11,329	607	1,968	654	114	163	15	47	19	627	....	17.37	1.21
1896 .....	11,634	648	1,985	572	112	162	21	67	27	713	....	17.06	1.25
1897 .....	11,154	614	1,806	456	136	173	185	39	21	522	....	16.19	1.16
1898 .....	10,866	613	1,470	185	33	185	97	68	27	599	....	13.50	1.13



**Table II.—Total Number of Deaths under Five Years, and Five Years and over, for Twenty-eight Years, with Percentages to the Total Mortality.**

YEARS.	Total Deaths	Five Years and over.	Under Five Years.	PERCENTAGES.	
				Five Years and over.	Under Five Years.
1871.....	5,888	3,498	2,395	59.83	40.67
1872.....	8,090	4,676	3,414	57.79	42.21
1873.....	7,869	4,580	3,289	58.20	41.80
1874.....	7,812	4,454	3,358	57.01	42.99
1875.....	9,060	5,088	3,972	56.16	43.84
1876.....	8,253	4,722	3,531	57.22	42.78
1877.....	7,316	4,334	2,982	59.24	40.76
1878.....	7,636	4,630	3,006	60.63	39.37
1879.....	7,398	4,598	2,805	62.08	37.92
1880.....	8,531	5,182	3,349	60.74	39.26
1881.....	9,016	5,702	3,314	63.24	36.76
1882.....	8,995	5,844	3,151	64.97	35.03
1883.....	9,740	6,113	3,627	62.76	37.24
1884.....	9,622	6,052	3,570	62.90	37.10
1885.....	9,618	6,152	3,466	63.97	36.03
1886.....	9,268	6,082	3,186	55.63	34.37
1887.....	10,073	6,411	3,662	63.55	36.35
1888.....	10,197	6,598	3,599	64.71	35.29
1889.....	10,259	6,626	3,633	64.59	35.41
1890.....	10,181	6,832	3,349	67.11	32.89
1891.....	10,571	6,968	3,608	65.87	34.13
1892.....	11,236	7,501	3,735	66.76	33.24
1893.....	11,710	7,723	3,987	65.96	34.04
1894.....	11,520	7,412	4,108	64.34	35.66
1895.....	11,329	7,394	3,935	65.27	34.73
1896.....	11,634	7,579	4,055	65.15	34.85
1897.....	11,154	7,446	3,708	66.76	33.24
1898.....	10,886	7,309	3,577	67.14	32.86

Table III.—Deaths during the Year 1898, by Sex, Condition, Color, Nativity, Parentage and Season.

	January.	February.	March.*	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Total number of deaths...	901	785	913	930	868	714	871	1195	985	896	874	954	10,886
<i>Sex:</i>													
Males.....	447	397	463	492	450	397	448	608	516	452	441	489	5,600
Females.....	454	388	450	438	418	317	423	587	469	444	433	465	5,286
<i>Condition :</i>													
Married .....	288	226	271	311	283	238	250	238	238	277	267	341	3,228
Single.....	440	402	468	472	426	389	483	822	621	503	451	450	5,918
Widows.....	120	107	120	91	109	54	103	86	80	76	106	112	1,164
Widowers.....	42	44	45	48	37	36	29	38	36	30	38	41	464
Unknown.....	11	6	9	8	13	6	6	11	10	10	12	10	112
<i>Color:</i>													
White.....	880	764	896	896	840	698	852	1168	970	876	853	932	10,620
Colored.....	21	21	17	34	28	16	19	32	15	20	21	22	266
<i>Nativity:</i>													
United States.....	559	595	563	573	533	477	554	897	692	601	557	592	7,103
Ireland.....	183	142	199	198	169	119	164	159	162	161	151	191	1,998
England.....	29	16	16	21	16	16	19	19	22	18	22	14	228
Scotland.....	3	11	10	6	8	4	5	6	5	7	8	8	81
Germany.....	22	13	15	16	17	15	12	13	14	12	19	18	186
British Provinces.....	62	56	62	51	72	43	58	51	50	52	59	73	689
Italy.....	16	6	13	18	17	9	11	6	6	6	11	14	133
Russia.....	6	6	8	16	11	4	8	5	5	7	13	10	99
Other countries.....	16	27	18	19	13	22	21	29	20	23	16	18	242
Unknown.....	5	3	9	12	12	5	19	10	9	9	18	16	127
<i>Parentage:</i>													
American.....	215	199	209	200	197	169	184	271	176	203	198	207	2,428
Irish.....	288	247	317	331	285	249	297	360	342	314	319	354	3,703
English.....	28	14	15	14	12	15	19	18	24	24	18	20	221
Scotch.....	8	13	15	11	8	3	9	15	12	6	11	10	121
German.....	25	18	19	19	23	27	15	20	24	18	26	20	254
British Provinces.....	51	47	51	46	55	49	60	92	60	50	62	69	692
Italian.....	35	20	40	53	33	23	15	34	25	25	23	31	357
Russian.....	23	17	15	23	16	12	25	38	36	19	21	20	265
Other countries.....	64	61	71	72	69	60	80	110	84	82	50	64	867
Mixed.....	59	59	60	59	70	40	72	116	98	76	58	65	841
*Unknown.....	105	90	92	102	100	67	95	121	104	79	88	94	1,137

\* This includes deaths where one parent is unknown.

Table IV.—Deaths from Principal Zymotic Diseases.

	Total Deaths from each Cause.	Percentage of each Cause to Total Mortality.	Death per 1,000 Inhabitants.	Total Deaths per sex.		Total Deaths per sex under Five Years.		Total Deaths under Five Years.	Percentage of each Cause under Five Years to Total Mortality.
				M.	F.	M.	F.		
Small-pox.....									
Measles.....	27	.248	.050	13	14	13	13	26	.239
Scarlatina.....	33	.303	.060	16	17	9	10	19	.174
Diphtheria.....	170	1.562	.315	83	87	60	56	116	1.066
Croup.....	15	.138	.028	6	9	5	8	13	.119
Whooping-cough.....	68	.625	.125	26	42	24	42	66	.606
Typhoid fever.....	185	1.699	.340	126	59	4	2	6	.055
Erysipelas.....	30	.276	.055	15	15	5	6	11	.101
Puerperal fever.....	8	.073	.015		8				
Carbuncle.....	4	.039	.007	4					
Dysentery.....	41	.377	.076	23	18	1	3	4	.037
Diarrhoea.....	102	.937	.188	55	47	44	35	79	.726
Cholera morbus.....	15	.138	.028	7	8		1	1	.009
Cholera infantum.....	441	4.051	.814	236	205	235	204	439	4.033
Cerebro-spinal fever.....	97	.891	.179	64	33	21	18	39	.358
Influenza.....	29	.266	.053	14	15	1	1	2	.018
Intermittent fever.....	1	.009	.002	1					
Rheumatism.....	20	.184	.037	6	14				
Pyæmia.....	7	.064	.013	2	5		1	1	.009
Syphilis, congenital.....	18	.165	.033	11	7	11	7	18	.165
Syphilis, tertiary.....	9	.083	.016	4	5				
Purpura.....	7	.064	.013	4	3	2	2	4	.037
Alcoholism.....	57	.524	.105	46	11				
Septicæmia.....	62	.569	.114	25	37	5	4	9	.083
Typhus fever.....									
Tonsillitis.....									
Remittent fever.....	1	.009	.002		1		1	1	.009
Yellow fever.....									

Table V.—Yearly Percentages of Principal Zymotic Deaths from 1879 to 1898, inclusive, to Total Mortality.

	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.
Small-pox	0.07	0.11	0.06	0.08	0.10	0.10	0.09	0.09	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Measles	2.014	3.88	1.197	2.77	1.960	1.136	2.172	1.621	1.873	1.873	1.873	1.873	1.873	1.873	1.873	1.873	1.873	1.873	1.873	1.873
Scarlatina	6.285	6.963	6.963	5.061	4.663	3.655	3.472	3.519	3.137	4.069	5.498	3.938	2.184	3.684	4.064	7.092	5.190	4.435	3.684	1.962
Diphtheria	2.061	2.160	2.229	1.300	1.673	1.475	1.259	1.014	0.833	1.167	1.160	0.999	0.901	0.966	0.997	0.929	0.982	0.951	0.931	1.138
Croup	1.013	1.101	0.854	1.022	1.318	1.881	1.270	0.969	0.814	1.725	0.966	0.883	0.868	0.400	0.841	0.963	0.414	0.766	0.249	0.625
Whooping-cough	1.608	1.804	2.235	2.336	2.032	2.245	1.950	1.456	1.816	1.667	1.813	1.622	1.456	1.219	1.253	1.223	1.458	1.392	1.561	1.689
Typhoid fever	0.27	0.251	0.265	0.444	0.451	0.448	0.415	0.420	0.337	0.402	0.324	0.333	0.368	0.329	0.478	0.377	0.300	0.258	0.257	0.276
Erysipelas	0.801	0.736	0.794	0.833	0.728	0.677	0.577	0.188	0.228	0.176	0.117	0.265	0.170	0.249	0.239	0.188	0.123	0.172	0.117	0.073
Puerperal fever	0.27	0.086	0.063	0.044	0.020	0.031	0.072	0.032	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065
Carbuncle	1.365	1.488	1.064	0.922	0.903	0.863	0.844	0.868	0.865	0.470	0.741	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254	0.254
Dysentery	2.487	2.066	2.906	2.568	2.731	2.265	1.767	1.863	1.678	1.510	1.569	1.119	0.801	0.685	0.709	0.607	0.609	0.569	0.569	0.569
Diarrhoea	5.117	6.071	4.924	5.626	5.742	5.772	4.798	4.894	4.314	4.386	4.891	5.010	5.010	5.010	4.351	4.989	4.413	4.942	3.566	4.031
Cholera morbus	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Cholera infantum	0.378	0.222	0.454	0.333	0.215	0.270	0.405	0.302	0.486	0.274	0.302	0.196	0.099	0.068	0.017	0.130	0.068	0.043	0.009	0.009
Cerebro-spinal fever	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Intermittent fever	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Remittent fever	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Rheumatism	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Pyæmia	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Syphilis, congenital	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Syphilis, tertiary	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Purpura	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Alcoholism	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Septicæmia	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Yellow fever	0.018	0.068	0.033	0.023	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Tonsillitis	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040

Table VI. — Ten of the Principal Causes of Death, by Sex and Month, with Nativity of Parents.

	NATIVITY OF PARENTS.												
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
M. F. M. F													



Table VIII. — Deaths from Principal Zymotic Diseases, By Sex and Month, with Nativity of Parents.

		Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.	NATIVITY OF PARENTS.											
																U. S.	Ireland.	England.	Scotland.	Germany.	British Provinces.	Italy.	Russia.	Other Countries.	Mixed.	Unknown.
	M. F. M. F																									

Cholera infantum	1	1	3	...	...	...	1	1	2	4	2	45	28	108	117	61	47	13	7	...	...	...	...	236	265	99	99	...	2	3	40	21	29	577	6	15	441	
Cerebro-spinal fever	5	3	7	2	9	3	12	5	9	4	6	4	2	4	2	1	4	1	1	2	2	2	5	2	64	33	15	31	2	1	14	5	2	9	10	6	97	
Yellow fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
Rheumatism	...	...	...	1	3	3	...	...	1	2	1	1	1	1	...	1	2	...	1	...	...	...	...	1	6	14	2	9	1	...	2	1	...	...	1	4	...	20
Pyæmia	1	...	1	...	...	...	1	...	3	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	2	5	1	5	...	...	...	...	...	...	1	...	7	
Syphilis, congenital	1	1	...	...	...	...	1	1	2	1	1	2	...	3	...	...	...	...	2	1	...	1	1	1	1	1	7	4	3	...	...	1	1	...	3	6	18	
Syphilis, tertiary	1	...	1	...	...	...	2	...	...	...	1	1	...	1	1	1	...	...	...	...	...	...	...	4	5	5	2	...	...	...	...	...	...	...	...	1	9	
Purpura	...	...	...	1	1	...	...	1	1	...	...	...	...	...	...	...	...	...	1	1	...	1	...	...	4	3	1	1	...	...	2	...	1	...	2	...	7	
Alcoholism	4	1	2	2	6	...	9	1	8	...	4	...	5	1	2	1	2	...	4	2	4	2	1	1	46	11	8	21	2	1	...	1	...	3	2	19	57	
Septicæmia	2	3	1	4	2	1	1	2	3	2	4	1	2	3	4	4	5	1	3	1	3	4	4	25	37	14	16	2	1	2	6	2	4	6	1	8	62	
Remittent fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	1	...	1	
Tonsillitis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Typhus fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Influenza	1	1	...	1	4	4	1	...	1	1	...	1	...	...	...	...	1	...	...	...	...	...	4	5	14	15	7	14	...	...	1	...	1	8	3	29		
Intermittent fever	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	1	1	



Table IX. — Deaths from Principal Zymotic Diseases, arranged by Age and Sex.

	Und'r 1 yr.	2 yrs. and under 2 yrs.	3 yrs. and under 3 yrs.	4 yrs. and under 4 yrs.	5 yrs. and under 5 yrs.	Total under 5 yrs.	10 yrs. and under 10 yrs.	15 yrs. and under 15 yrs.	20 yrs. and under 20 yrs.	30 yrs. and under 30 yrs.	40 yrs. and under 40 yrs.	50 yrs. and under 50 yrs.	60 yrs. and under 60 yrs.	70 yrs. and under 70 yrs.	80 yrs. and under 80 yrs.	90 yrs. and under 90 yrs.	Total of all ages.	
M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F. M. F.	
Small-pox .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Measles .....	5	4	5	6	2	1	...	...	...	...	...	...	...	...	...	...	...	13 14
Scarlatina .....	1	1	2	3	3	2	2	9	10	4	5	1	1	1	1	...	...	16 17
Diphtheria .....	6	8	14	13	12	17	15	5	13	13	60	56	12	26	6	1	1	83 87
Croup .....	1	1	...	2	1	3	1	2	2	...	5	8	...	1	1	...	...	6 9
Whooping-cough .....	19	26	5	13	...	1	...	1	24	42	2	...	...	...	...	...	26 42	
Typhoid fever .....	1	...	1	1	2	...	...	...	4	2	4	4	2	3	11	7	126 50	
Erysipelas .....	5	6	...	...	...	...	...	...	5	6	...	...	...	1	...	...	15 15	
Puerperal fever .....	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	4	8	
Carbuncle .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	
Dysentery .....	1	3	...	...	...	...	...	...	1	3	1	...	...	3	...	6	23 18	
Diarrhoea .....	40	33	3	1	1	1	...	...	...	...	...	...	...	1	1	...	55 47	
Cholera morbus .....	1	...	...	...	...	...	...	...	...	...	...	...	...	1	2	1	7 8	
Cholera infantum .....	188	163	43	35	2	6	7	...	1	...	235	204	1	1	...	...	236 205	
Cerebro-spinal fever .....	8	8	6	4	3	4	4	1	...	1	21	18	6	3	5	4	64 33	

[illegible]

Table X. — The Number and Percentages of Deaths in each Quarter of each Year during a Period of Thirty-four Years, 1865-1898, inclusive.

YEARS.	FIRST QUARTER		SECOND QUARTER.		THIRD QUARTER.		FOURTH QUARTER.		Rate per 1,000 Inhabitants. <sup>1</sup>
	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.	
1865.....	1,115	24.55	1,068	23.52	1,353	29.80	1,005	22.13	23.61
1866.....	999	22.81	957	21.85	1,338	30.56	1,085	24.78	22.51
1867.....	1,071	24.22	950	21.49	1,191	26.94	1,209	27.35	22.38
1868.....	1,341	24.30	1,303	21.80	1,736	31.45	1,239	22.45	23.89
1869.....	1,374	24.88	1,297	23.48	1,552	28.28	1,290	23.86	23.54
1870.....	1,395	22.88	1,314	21.55	1,983	32.52	1,406	23.05	24.34
1871.....	1,411	23.97	1,299	22.06	1,842	31.28	1,336	22.69	22.82
1872.....	1,697	20.97	1,777	21.97	2,511	31.04	2,105	26.02	30.43
1873.....	2,115	26.88	1,726	21.33	2,278	28.95	1,750	22.24	28.75
1874.....	1,805	23.11	1,818	23.27	2,278	29.16	1,911	24.46	23.57
1875.....	2,190	24.17	2,011	22.20	2,680	29.58	2,179	24.05	26.50
1876.....	2,246	27.21	1,809	21.92	2,375	28.78	1,823	22.09	20.96
1877.....	1,723	23.55	1,613	22.05	2,317	31.67	1,663	22.73	20.89
1878.....	1,743	22.82	1,744	22.84	2,174	28.47	1,975	25.87	21.55

1879.....	1,947	26.32	1,615	21.83	1,969	26.48	1,877	26.37	20.63
1880.....	2,015	23.62	1,839	21.45	2,500	29.36	2,187	26.63	23.51
1881.....	2,332	25.86	2,021	22.42	2,466	27.35	2,197	24.38	24.48
1882.....	2,104	23.39	2,212	24.59	2,459	27.67	2,190	24.35	24.07
1883.....	2,268	23.28	2,409	24.74	2,767	28.31	2,306	23.67	25.69
1884.....	2,284	23.73	2,103	21.85	2,725	28.53	2,510	26.09	25.01
1885.....	2,510	26.10	2,484	25.82	2,592	26.95	2,053	21.13	24.64
1886.....	2,314	23.89	2,113	22.79	2,580	27.84	2,361	25.48	23.09
1887.....	2,362	23.45	2,281	22.65	2,913	28.90	2,518	25.00	24.41
1888.....	2,790	27.36	2,420	23.73	2,649	25.98	2,338	22.33	24.03
1889.....	2,457	23.75	2,543	24.79	2,854	27.82	2,425	23.64	23.52
1890.....	2,911	28.60	2,244	22.04	2,689	26.51	2,327	22.85	22.70
1891.....	2,442	23.10	2,540	24.03	2,835	26.82	2,754	26.05	23.09
1892.....	2,998	26.03	2,552	22.98	2,968	26.33	2,698	24.01	24.04
1893.....	2,969	25.35	2,847	24.31	3,013	26.74	2,881	24.60	24.55
1894.....	2,972	25.80	2,592	22.50	3,182	27.62	2,774	24.08	23.66
1895.....	2,985	26.44	2,574	22.73	3,027	26.72	2,733	24.12	22.60
1896.....	2,987	24.90	2,807	24.13	3,319	28.53	2,611	23.44	22.53
1897.....	3,022	27.09	2,802	25.12	2,833	25.40	2,497	22.39	21.08
1898.....	2,599	23.87	2,512	23.08	3,051	28.03	2,724	25.02	20.09

<sup>1</sup> Population estimated in non-census years on Dr. Farr's formula.

**Table XI. — Deaths from Ten of the Principal Causes.**

	Total Deaths from each Cause.	Percentage of each Cause to Total Mortality.	Death per 1,000 Inhabitants.	Total Deaths by Sex.		Total Deaths by Sex under Five Years.		Total Deaths under Five Years.	Percentage of each Cause under Five Years to Total Mortality.
				M.	F.	M.	F.		
Consumption .....	1,241	11.400	2.290	639	602	27	20	47	.432
Pneumonia.....	1,169	10.738	2.157	623	546	271	207	478	4.391
Heart disease.....	984	8.580	1.724	454	480	13	17	30	.276
Violent deaths.....	616	5.659	1.137	444	172	39	38	77	.707
Cholera infantum...	441	4.051	.814	236	205	235	204	439	4.033
Cancer .....	412	3.785	.760	122	290				
Apoplexy .....	382	3.509	.705	186	196	4	4	8	.073
Bronchitis.....	380	3.490	.701	169	211	101	105	206	1.892
Marasmus, etc.....	322	2.958	.594	160	162	152	144	296	2.725
Meningitis .....	308	2.830	.568	184	124	136	100	336	2.169

**Table XII. — Total Deaths each Quarter of the last Five Years, with the Aggregate and Average Number from 1889 to 1893, inclusive.**

	1894.	1895.	1896.	1897.	1898.	5 years, 1889-1893.	
						Aggregate.	Average.
First quarter.....	2,972	2,995	2,897	3,022	2,599	13,757	2,751
Second quarter.....	2,592	2,574	2,807	2,802	2,512	12,756	2,551
Third quarter.....	3,182	3,027	3,319	2,633	3,051	14,859	2,872
Fourth quarter.....	2,774	2,733	2,611	2,497	2,724	13,085	2,617
Total each year..	11,520	11,329	11,634	11,154	10,886	53,957	10,791

**Table XIII. — Total Deaths and Percentages each Quarter for the year 1898, with Aggregates and Percentages for the Ten Years Previous.**

	1898.		1888-1897.	
	Deaths.	Per cent.	Deaths.	Per cent.
First quarter.....	2,599	23.87	23,423	25.90
Second quarter.....	2,512	23.08	25,951	28.64
Third quarter.....	3,051	28.03	29,369	28.75
Fourth quarter.....	2,724	25.02	26,036	23.71
Total .....	10,886	100.00	109,791	100.00

Table XIV. — Parentage of Children under One, Two, and Five Years for each Month during Year 1898.

	JANUARY.			FEBRUARY.			MARCH.			APRIL.			MAY.			JUNE.		
	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.
United States.....	50	14	9	44	10	10	47	7	11	46	10	6	33	2	6	33	5	10
Foreign.....	85	20	20	68	27	20	85	94	9	79	33	27	72	21	21	79	17	22
Mixed.....	25	2	7	20	7	5	27	5	5	16	5	5	26	8	10	13	3	6
One parent known.....	20	2	.....	15	.....	2	18	1	.....	14	2	.....	8	1	.....	12	1	1
Unknown.....	3	.....	.....	3	.....	.....	2	.....	1	9	1	.....	7	.....	1	4	.....	.....
Total.....	183	38	36	150	44	37	179	47	26	164	51	38	146	32	38	141	26	39

	JULY.			AUGUST.			SEPTEMBER.			OCTOBER.			NOVEMBER.			DECEMBER.		
	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.	Under 1 yr.	1 yr. and under 2 yrs.	2 yrs. and under 5 yrs.
United States.....	57	14	4	131	17	9	68	14	5	59	9	8	32	9	7	36	6	13
Foreign.....	101	23	34	256	57	17	176	54	12	110	23	24	90	29	25	88	26	27
Mixed.....	44	6	2	86	14	3	62	10	2	35	6	9	22	7	5	22	8	3
One parent known.....	13	2	.....	30	1	.....	16	2	.....	15	.....	.....	12	1	.....	5	.....	.....
Unknown.....	13	2	.....	13	.....	.....	8	2	.....	4	.....	.....	2	1	.....	3	1	.....
Total.....	228	47	40	516	89	29	330	82	19	223	38	41	168	47	37	154	41	43

Table XV.—Cases Reported, and Deaths from Small-pox, Diphtheria, Scarlet Fever and Typhoid Fever, with Percentages.

DATE.	SMALL-POX. <sup>1</sup>		Percentages.	DIPHTHERIA.		Percentages.	SCARLET FEVER.		Percentages.	TYPHOID FEVER.		Percentages.
	Cases.	Deaths.		Cases.	Deaths.		Cases.	Deaths.				
1872	2,592	788	28.4	1,370	448	32.7	1,334	104	7.7			
1873	1,108	302	27.3	1,167	391	33.5	951	68	8.0			
1874	7	1	28.5					149	16.6			
1875	5	2	20.0									
1876	6	2										
1877	17	4	23.5									
1878												
1879												
1880	4	1	25.0	1,715	588	34.2	497	33	6.6			
1881	44	6	13.6	1,680	601	35.7	388	35	9.1			
1882	24	8	33.3	1,396	458	32.8	689	75	10.8			
1883	8	1	12.4	1,415	444	31.4	1,408	211	14.9			
1884	1	1	100.0	1,212	345	28.46	2,526	209	8.2			
1885	11	1	9.0	1,263	334	26.44	1,665	156	9.2			
1886	1	1		1,198	329	27.69	1,149	81	7.0			
1887	4	4		1,049	316	30.12	1,549	186	12.58			
1888	8	2	25.0	1,411	470	33.30	707	65	9.19			
1889	10	1	20.0	1,814	564	31.09	464	23	4.96			
1890	1			1,475	401	27.18	924	42	4.54			
1891				831	232	27.91	1,327	64	4.82			
1892				1,353	414	30.59	2,938	262	8.91			
1893	26	4	15.3	1,465	476	32.49	2,580	248	9.61			
1894	77	22	28.5	3,019	817	27.06	2,230	192	8.60			
1895				4,069	588	14.43	1,612	114	7.07			
1896				4,489	516	11.49	1,216	121	9.95			
1897	10			3,398	411	12.09	1,988	136	7.02			
1898				1,661	170	10.23	877	33	3.76			
										{ Oct. 1 to Dec. 31. }	{ Oct. 1 to Dec. 31. }	
										335	76	26.8
										808	212	26.2
										887	196	22.3
										948	216	22.6
										767	162	19.8
										814	135	16.5
										940	183	19.46
										924	170	18.39
										1,071	186	17.37
										847	135	15.29
										966	154	15.94
										765	137	17.96
										934	148	15.41
										915	141	15.41
										1,028	163	15.88
										1,076	162	15.06
										1,609	173	28.40
										555	186	33.33

<sup>1</sup> Exclusive of quarantine.







Table XVII.<sup>1</sup>—Diseases Arranged Alphabetically.

Abortion (criminal)	5
Abscess (unclassified)	16
“ of brain	4
“ of liver	8
“ of lung	10
Accidents (unclassified)	114
“ burns and scalds	64
“ drowned	36
“ elevator	18
“ fall	47
“ fracture of neck	9
“ “ of thigh	12
“ “ of skull	35
“ “ of spine	6
“ poisoning	12
“ poisoning by illuminating gas (suicides included)	56
“ railroad	55
“ suffocation	25
Alcoholism	57
Anæmia	13
“ pernicious	21
Aneurism, not located	7
“ aorta	5
Angina pectoris	18
Anus, imperforate	2
Appendicitis	60
Apoplexy	382
Arterio sclerosis	34
Asthenia	13
Asthma	10
Atelectasis pulmonum	13
Asphyxia of new-born	9
Brain, disease of (unclassified)	14
“ abscess of	4
“ congestion of	6
“ embolism of	7
“ inflammation of	4
“ softening of	15
“ tumor of	20
Bronchitis (unclassified)	8
“ acute	36
“ chronic	47
“ capillary	49
Cancer (unclassified)	95
“ of abdomen	7
“ of bladder	6

<sup>1</sup> This table does not include the total number of deaths.

Cancer of bowels . . . . .	21
" of breast . . . . .	35
" of face . . . . .	18
" of kidney . . . . .	1
" of liver . . . . .	57
" of neck . . . . .	2
" of œsophagus . . . . .	4
" of ovaries . . . . .	5
" of rectum . . . . .	12
" of stomach . . . . .	76
" of throat . . . . .	10
" of tongue . . . . .	4
" of uterus . . . . .	59
Cholera infantum . . . . .	441
" morbus . . . . .	15
Cellulitis . . . . .	4
Cirrhosis of kidney . . . . .	3
" of liver . . . . .	48
Convulsions . . . . .	44
Croup . . . . .	15
Cystitis . . . . .	19
Cyanosis . . . . .	17
Debility . . . . .	11
Diabetes . . . . .	20
" mellitus . . . . .	31
Diarrhœa . . . . .	102
Diphtheria . . . . .	170
Dysentery . . . . .	41
Embolism (unclassified) . . . . .	1
" of brain . . . . .	7
" of heart . . . . .	6
" of lungs . . . . .	7
Emphysema . . . . .	6
Empyema . . . . .	7
Enteritis . . . . .	46
Entero-colitis . . . . .	48
Epilepsy . . . . .	12
Erysipelas . . . . .	30
Extra-uterine pregnancy . . . . .	5
Fever, puerperal . . . . .	8
" scarlet . . . . .	33
" typhoid . . . . .	185
Gangrene . . . . .	20
Gastro enteritis . . . . .	186
Goitre (exophthalmic) . . . . .	1
Heart disease (unclassified) . . . . .	574
" dilatation of . . . . .	23
" embolism of . . . . .	6
" endocarditis . . . . .	45
Heart, fatty degeneration of . . . . .	120

Heart, hypertrophy of . . . . .	6
“ malformation of . . . . .	14
“ pericarditis . . . . .	9
“ valvular . . . . .	237
Heat stroke . . . . .	9
Hemophilia . . . . .	4
Hernia, strangulated . . . . .	20
Hydrocephalus and tubercular meningitis . . . . .	146
Homicide . . . . .	12
Inanition . . . . .	185
Insanity . . . . .	23
Jaundice . . . . .	4
Kidney diseases (unclassified) . . . . .	1
“ Bright's disease of . . . . .	113
“ cancer of . . . . .	1
“ cirrhosis . . . . .	3
“ inflammation of . . . . .	285
Laryngitis . . . . .	2
Leucocythæmia . . . . .	7
Liver diseases (unclassified) . . . . .	24
“ abscess of . . . . .	8
“ cancer of . . . . .	57
“ cirrhosis of . . . . .	48
“ inflammation of . . . . .	5
Locomotor ataxia . . . . .	12
Lung diseases (unclassified) . . . . .	2
“ abscess of . . . . .	10
“ congestion of . . . . .	10
“ œdema of . . . . .	4
“ consumption of . . . . .	1,241
“ embolism of . . . . .	7
“ inflammation of . . . . .	1,169
Malformation of heart . . . . .	14
Measles . . . . .	27
Meningitis . . . . .	308
“ cerebro-spinal . . . . .	97
Obstruction of bowels . . . . .	36
Old age . . . . .	223
Ovarian cancer . . . . .	5
“ tumor . . . . .	3
Paralysis . . . . .	81
Prostate gland (disease of) . . . . .	8
Peritonitis . . . . .	113
Pleurisy . . . . .	14
Pneumonia (unclassified) . . . . .	993
“ broncho . . . . .	166
“ pleuro . . . . .	10
Poisoning (accidental) . . . . .	12
Premature birth . . . . .	229
Puerperal diseases, not including puerperal fever . . . . .	43

Pyæmia . . . . .	7
Rheumatism . . . . .	20
Scrofula . . . . .	7
Septicæmia . . . . .	62
Sarcoma . . . . .	12
Spinal disease (unclassified) . . . . .	5
"    "    Pott's . . . . .	4
"    inflammation . . . . .	12
Spina bifida . . . . .	8
Stomach, inflammation of . . . . .	43
"    ulceration of . . . . .	11
Suffocation (accidental) . . . . .	25
Suicide . . . . .	83
Surgical operation (death following) . . . . .	26
Syphilis . . . . .	9
"    congenital . . . . .	18
Tabes-mesenterica, and marasmus . . . . .	315
Teething . . . . .	3
Tetanus . . . . .	4
Tuberculosus . . . . .	225
Tumor (unclassified) . . . . .	7
"    of abdomen . . . . .	2
"    of brain . . . . .	20
"    of ovary . . . . .	3
"    of uterus . . . . .	12
Uterine disease, cancer . . . . .	59
"    "    tumor . . . . .	12
Umbilical hæmorrhage . . . . .	4
Uræmia . . . . .	19
Whooping-cough . . . . .	68

## CHOLERA INFANTUM.

Comparison of Deaths from Cholera Infantum for Three Months of each Year during a Period of Twenty-eight Years, with Temperature and Humidity, also Percentages to the Total Mortality.

CHOLERA INFANTUM.					TEMPERATURE.											
					June.			July.			August.					
June.	July.	August.	Total Deaths.	Percentage to Total Mortality.	High- est Temp.	Lowest Temp.	Mean Temp.	Mean Humid- ity.	High- est Temp.	Lowest Temp.	Mean Temp.	Mean Humid- ity.	High- est Temp.	Lowest Temp.	Mean Temp.	Mean Humid- ity.
871	90	945	425	7.91	91.5	50.	55.9	57.2	92.5	57.	70.8	59.2	89.	55.	71.2	71.2
872	26	927	584	7.21	93.	47.	58.2	59.3	98.5	55.	74.7	67.6	96.	50.	72.4	75.5
873	19	108	263	5.71	93.	47.	67.9	59.3	98.5	55.	74.7	67.6	96.	50.	72.4	75.5
874	13	108	276	5.63	94.	49.	66.7	69.1	94.	45.	73.	69.9	91.	51.	68.9	69.4
875	13	210	268	5.47	94.	46.	66.1	69.1	94.	45.	73.	69.9	91.	51.	70.2	70.7
876	13	210	268	5.28	94.	44.	66.1	69.1	94.	45.	73.	69.9	91.	51.	68.9	69.4
877	14	206	186	5.45	90.	47.	66.9	56.8	96.	52.	73.9	69.4	96.	50.	59.9	68.2
878	8	135	154	3.73	92.	45.	64.1	57.4	96.	54.	70.1	67.1	97.	58.	67.8	73.5
879	8	135	154	3.73	96.	45.	64.1	57.4	94.	50.	70.1	67.1	96.	52.	68.1	68.3
880	24	170	182	3.78	96.	45.	67.3	67.4	101.	52.	70.1	73.2	96.	47.	68.9	72.6
881	104	196	355	4.51	98.	44.	60.6	70.	89.	52.	68.5	73.2	97.	53.	69.5	74.
882	11	187	395	4.39	94.	45.	66.9	63.8	96.	52.	71.1	65.1	92.	51.	70.	66.8
883	23	225	190	4.62	90.5	51.	66.	72.9	96.	51.4	71.1	71.7	91.8	46.	67.6	66.9
884	11	158	173	3.61	92.6	42.	66.	74.5	93.6	53.6	68.3	75.5	94.3	51.	68.2	84.5
885	16	226	183	3.77	91.9	45.8	66.4	62.	92.8	51.4	71.3	69.8	88.8	47.2	67.4	76.
886	5	170	151	3.51	81.7	47.5	64.5	70.6	95.4	54.5	70.8	69.8	90.4	49.3	67.1	71.7
887	6	223	175	3.10	80.	47.5	64.5	71.7	96.	61.	73.	77.7	86.3	52.5	67.1	74.2
888	6	190	192	3.21	96.	49.	68.4	68.	88.	51.	68.3	68.06	86.2	52.	69.	70.7
889	28	200	124	3.52	87.	50.	67.7	73.3	86.	55.	69.	82.2	84.	52.	67.4	78.6
890	5	178	206	3.89	87.	50.	64.2	70.8	96.	56.	69.	82.	89.	50.	68.9	75.6
891	23	236	206	4.89	96.	45.	70.	70.8	96.	56.	69.	72.	90.	54.	70.	78.
892	16	269	186	4.28	96.	49.	66.	70.	96.	54.	73.	68.3	94.	56.	68.6	69.4
893	8	166	177	3.41	94.	52.	66.	83.	91.	54.	71.4	68.2	93.	53.	69.6	59.4
894	13	251	160	4.94	96.	47.	69.	74.9	97.	56.	73.7	62.6	90.	53.	68.6	73.
895	8	127	182	3.17	96.	50.	67.	70.	86.	54.	68.	62.6	90.	50.	70.9	69.
896	18	315	152	4.88	92.	49.	66.	70.	93.	57.	72.	74.	96.	52.	71.	74.
897	7	184	173	3.03	87.	47.	66.	71.	94.	55.	71.6	81.	96.	53.	70.	77.
898	6	73	225	2.79	92.	50.	66.	76.	99.	56.	72.	75.	94.	56.	73.	77.

## COMPARATIVE DEATHS IN AMERICAN AND FOREIGN CITIES.

The following tables have been prepared to show the comparison of deaths in a few large American and foreign cities, as compared with the city of Boston. It is to be regretted that the amount of information desired is not fully complete, owing to the scarcity of material and information furnished, but in their present condition, as a matter of reference, they may be of value.

**Boston.**

YEARS.	Population.	Total Deaths.	Population of Children under 5 years of age. <sup>1</sup>	Deaths of children under 5 years of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880.....	362,839	8,531	29,649	3,349	588	33	154	49
1881.....	368,190	9,016	30,809	3,314	601	35	207	108
1882.....	373,620	8,995	31,969	3,151	458	75	212	25
1883.....	379,129	9,740	33,129	3,627	445	211	198	152
1884.....	384,720	9,622	34,289	3,570	345	209	216	13
1885.....	390,393	9,618	35,449	3,466	334	156	152	84
1886.....	401,374	9,268	36,582	3,186	329	81	135	36
1887.....	412,663	10,073	37,717	3,662	316	195	183	119
1888.....	424,274	10,197	38,849	3,509	470	65	170	27
1889.....	436,208	10,259	39,963	3,633	564	23	186	46
1890.....	448,477	10,181	41,117	3,349	401	42	155	19
1891.....	457,772	10,571	42,251	3,608	232	64	154	21
1892.....	467,260	11,236	43,363	3,735	414	262	137	19
1893.....	476,945	11,710	44,518	3,967	476	248	148	27
1894.....	486,830	11,520	45,654	4,108	817	192	141	8
1895.....	501,083	11,329	46,787	3,985	588	114	163	19
1896.....	516,305	11,634	47,920	4,055	516	121	162	27
1897.....	523,912	11,154	49,053	3,708	411	136	173	21
1898.....	541,827	10,886	50,185	3,577	170	33	185	27

<sup>1</sup> Corrected by census years.

## Philadelphia, Pa.

YEARS.	Population.	Total Deaths.	Population of Children under 5 years of age.	Deaths of Children under 5 yrs. of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880 <sup>1</sup> .....	846,980	17,711	<sup>1</sup> 91,544	6,594	323	291	498	108
1881 .....	868,000	19,515	<sup>2</sup> 92,744	7,124	457	486	645	17
1882 .....	886,539	20,069	94,004	7,254	933	310	650	91
1883 .....	907,041	20,076	95,234	7,417	1,006	561	579	58
1884 .....	927,995	19,999	96,465	7,606	680	540	662	96
1885 .....	949,432	21,392	97,695	8,188	600	375	610	131
1886 .....	971,363	20,005	98,925	7,351	411	248	618	19
1887 .....	993,801	21,719	100,155	8,421	416	159	621	358
1888 .....	1,016,758	20,372	101,386	7,269	350	235	785	24
1889 .....	1,040,245	20,536	102,616	7,752	375	298	736	92
1890 <sup>1</sup> .....	1,046,964	21,732	<sup>1</sup> 103,847	7,913	528	189	666	105
1891 .....	1,069,264	23,367	105,077	8,479	918	341	684	25
1892 .....	1,092,168	24,305	.....	9,305	1,425	484	539	74
1893 .....	1,115,662	23,655	.....	8,690	892	267	456	88
1894 .....	1,139,457	22,680	.....	8,160	1,047	154	369	33
1895 .....	1,163,864	23,797	.....	8,401	1,020	79	469	84
1896 .....	1,188,798	23,982	.....	8,661	862	61	402	191
1897 .....	1,214,256	22,735	.....	7,605	1,231	282	401	64
1898 .....	1,240,266	23,790	.....	7,998	996	114	<sup>3</sup> 639	234

<sup>1</sup> Census years.<sup>2</sup> Estimated on the increase of census years.<sup>3</sup> Seventy-three of these were soldiers who contracted the disease in camps.



## (Old City of) New York, N. Y.

YEARS.	Population.	Total Deaths.	Population of Children under 5 yrs. of age. <sup>1</sup>	Deaths of Children under 5 yrs. of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880 <sup>1</sup> .....	1,209,268	31,937	140,673	14,650	1,390	618	373	479
1881.....	1,246,011	38,624	144,947	17,737	2,249	1,964	594	429
1882.....	1,288,870	37,924	149,351	17,520	1,525	2,066	516	913
1883.....	1,322,880	34,011	153,889	13,856	1,009	744	625	716
1884.....	1,363,075	35,044	158,565	15,272	1,090	608	476	762
1885.....	1,404,401	35,682	163,383	15,267	1,325	559	405	736
1886.....	1,447,166	37,351	168,347	16,121	1,727	371	433	668
1887.....	1,491,137	38,933	173,462	16,766	2,167	569	421	767
1888.....	1,536,444	40,175	178,733	17,358	1,914	1,361	364	591
1889.....	1,583,120	39,679	184,164	17,152	1,686	1,242	397	470
1890.....	1,631,232	40,103	189,760	16,305	1,262	408	352	730
1891.....	1,680,796	43,659	195,525	18,224	1,361	1,220	394	663
1892.....	1,827,396	44,317	.....	18,589	1,425	975	399	863
1893.....	1,891,306	44,479	.....	17,914	1,968	552	381	390
1894.....	1,957,452	41,175	.....	17,596	2,359	541	326	584
1895.....	1,879,195	43,420	210,523	13,221	1,634	468	322	793
1896 <sup>1</sup> .....	1,984,077	41,622	210,523	16,307	1,555	402	297	714
1897.....	1,990,562	38,887	226,327	15,394	1,377	500	299	391
1898.....	2,048,830	40,438	233,150	15,591	922	524	376	446

<sup>1</sup> Estimated July 1, 1896.

## Chicago, Ill.

YEARS.	Population Estimated.	Total Deaths.	Population of Children under 5 yrs. of age.	Deaths of Children under 5 yrs. of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880.....	503,298	10,462						
1881.....	540,000	13,874						
1882.....	560,639	13,234		6,645				
1883.....	580,000	11,555		5,875				
1884.....	630,000	12,471		6,666				
1885.....	665,000	12,474		6,187	706	279	496	78
1886.....	704,000	13,699		6,763	944	220	433	126
1887.....	760,000	15,409		7,568	1,002	190	381	341
1888.....	830,000	15,772		7,533	858	184	375	151
1889.....	1,106,000	16,946		8,204	1,126	185	453	204
1890.....	1,200,000	21,869		9,964	881	193	1,008	67
1891.....	1,250,000	27,754		12,301	958	499	1,997	265
1892.....	1,438,000	26,219		11,662	1,014	382	1,489	185
1893.....	1,600,000	27,095		12,364	975	329	670	234
1894.....	1,567,727	23,701		12,363	841	190	491	182
1895.....	1,600,000	24,319	227,200	10,449	1,775	77	518	158
1896.....	1,619,226	23,262	192,453	15,336	955	54	751	73
1897.....	1,619,226	21,809	192,453	8,546	702	81	437	139
1898.....	1,650,000	22,747	196,193	8,135	622	67	636	55

<sup>1</sup> School census, July 1, 1896.

## Brooklyn, N. Y.

YEARS.	Population.	Total Deaths.	Population of Children under 5 yrs. of age.	Deaths of Children under 5 yrs. of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.	Deaths from Consumption.
1885.....	687,000	15,369	89,310	6,756	519	363	153	175	1,995
1886.....	747,000	15,790	97,110	7,000	782	340	123	106	2,085
1887.....	778,800	17,079	101,140	7,577	950	271	143	172	2,026
1888.....	810,000	18,061	105,300	8,019	984	475	153	59	2,051
1889.....	842,000	18,480	109,460	8,265	1,101	273	161	205	2,055
1890.....	875,000	19,827	113,750	8,462	902	227	182	111	2,169
1891.....	910,000	21,349	118,300	9,388	766	485	180	203	2,117
1892.....	945,000	20,807	122,850	8,971	775	412	162	168	2,128
1893.....	980,000	21,017	127,400	8,763	607	307	179	111	2,174
1894.....	1,045,000	21,133	135,850	9,235	1,279	188	158	204	2,260
1895.....	1,110,000	22,568	124,000	9,277	1,139	124	173	192	2,299
1896.....	1,125,000	22,497	146,000	9,006	1,063	150	163	333	2,245
1897.....	1,160,000	20,674	130,500	8,252	795	187	173	190	2,164
1898.....	1,197,100	21,856	134,793	8,414	742	159	267	133	2,384

## St. Louis.

YEARS.	Population.	Total Deaths.	Deaths of Children under 5 yrs. of age.	Deaths from Diphtheria.	Deaths from Scarlet Fever.	Deaths from Typhoid Fever.	Deaths from Measles.	Deaths from Consumption.
1885.....	400,000	7,490	3,090	<i>Diph. - Croup.</i> 372 — 109	164	125	54	888
1886.....	400,000	8,268	3,434	719 — 160	149	124	6	915
1887.....	420,000	9,155	3,795	927 — 185	48	116	40	829
1888.....	440,000	9,015	3,659	564 — 167	30	130	31	800
1889.....	450,000	8,004	3,149	345 — 94	114	146	63	655
1890.....	460,000	8,409	3,115	186 — 58	87	140	1	843
1891.....	480,000	9,530	3,493	250 — 90	96	165	53	869
1892.....	500,000	10,225	3,607	195 — 91	150	441	7	882
1893.....	520,000	10,303	3,543	227 — 144	79	215	26	964
1894.....	540,000	8,710	3,192	240 — 139	29	171	3	875
1895.....	560,000	9,425	3,373	512 — 171	18	107	38	1,000
1896.....	570,000	9,897	3,326	273 — ....	11	108	17	1,026
1897.....	600,000	9,354	2,799	170 — 70	19	123	1	997
1898.....	623,000	8,908	3,358	152 — 51	28	95	21	1,001

## London, England.

YEARS.	Population.	Total Deaths.	Population of Children under 5 years of age.	Deaths of Children under 5 years of age.	Deaths from Diphtheria.	Deaths from Scariatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880 .....	3,771,139	81,832	.....	36,220	544	3,100	702	1,521
1881 .....	3,824,960	81,071	497,044	33,325	654	2,108	977	2,533
1882 .....	3,861,876	82,905	.....	36,259	863	2,004	975	2,329
1883 .....	3,901,164	80,578	.....	33,552	951	1,989	985	2,440
1884 .....	3,939,832	83,050	.....	36,080	973	1,444	936	2,285
1885 .....	3,978,883	80,000	.....	32,913	896	707	585	2,028
1886 .....	4,018,321	82,276	.....	34,319	846	688	618	2,078
1887 .....	4,058,150	82,304	.....	35,236	953	1,419	612	2,904
1888 .....	4,098,374	79,099	.....	32,669	1,311	1,190	694	2,425
1889 .....	4,138,996	76,026	.....	30,469	1,616	771	528	2,308
1890 .....	4,180,021	89,554	.....	36,123	1,417	876	618	3,291
1891 .....	4,221,452	90,216	501,558	33,340	1,361	589	547	1,907
1892 .....	4,263,294	87,749	.....	34,560	1,885	1,174	436	3,393
1893 .....	4,306,411	91,536	.....	35,200	3,265	1,596	719	1,661
1894 .....	4,349,166	77,039	.....	31,366	2,670	962	635	3,293
1895 .....	4,392,346	86,937	.....	35,095	2,316	829	614	2,633
1896 .....	4,421,955	83,511	.....	35,599	2,683	942	591	3,697
1897 .....	4,463,169	80,944	.....	32,238	2,263	781	593	1,928
1898 .....	4,504,766	83,936	536,522	34,184	1,772	583	585	3,075

## Paris, France.

YEARS.	Population.	Total Deaths.	Population of Children under 5 years of age. <sup>1</sup>	Deaths of Children under 5 years of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880 .....	.....	55,706	.....	17,674	2,048	345	2,008	962
1881 .....	2,239,938	55,103	148,601	17,159	2,211	440	1,955	897
1882 .....	.....	56,854	.....	17,158	2,244	156	3,214	1,005
1883 .....	.....	54,763	.....	16,843	1,781	88	1,890	1,043
1884 .....	.....	55,059	.....	16,968	1,928	155	1,503	1,501
1885 .....	.....	52,726	.....	15,244	1,655	191	1,320	1,524
1886 .....	2,260,945	55,110	146,177	16,493	1,512	403	954	1,210
1887 .....	.....	52,836	.....	15,206	1,585	224	1,385	1,623
1888 .....	.....	51,230	.....	14,463	1,729	198	756	915
1889 .....	.....	54,083	.....	14,679	1,706	170	1,008	1,190
1890 .....	.....	54,566	150,490	15,068	1,668	223	665	1,495
Census of 13th April, 1891.	2,424,705							
1891 .....	2,424,705	54,443	150,490	14,048	1,531	208	549	1,020
1892 .....	2,424,705	54,536	150,490	14,353	1,403	198	691	999
1893 .....	2,424,705	52,955	.....	13,046	1,266	177	570	677
1894 .....	2,424,705	<sup>2</sup> 49,205	150,490	11,901	1,009	151	697	998
1895 .....	2,424,705	51,451	.....	.....	421	179	274	682
1896 .....	2,511,629	47,929	188,941	10,363	444	190	262	656
1897 .....	2,511,629	46,968	156,494	10,528	298	65	249	821
1898 .....	2,511,629	49,574	156,494	11,671	259	138	256	876

<sup>1</sup> Estimated, 1891.<sup>2</sup> Inhabitants of Paris only.

## Berlin, Germany.

YEARS.	Population.	Total Deaths. <sup>1</sup>	Population of Children under 5 yrs. of age.	Deaths of Children under 5 yrs. of age. <sup>2</sup>	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
Beginning . . .	1,089,070	.....	142,476					
1880 . . . . .		32,823	.....	19,249	1,198	872	527	376
End . . . . .	1,123,749	.....	183,060					
1881 . . . . .		31,055	.....	17,483	1,593	908	352	201
End . . . . .	1,158,559	.....	143,828					
1882 . . . . .		30,465	.....	16,990	1,914	604	357	144
End . . . . .	1,196,205	.....	146,138					
1883 . . . . .		35,056	.....	19,902	2,651	867	222	1,173
End . . . . .	1,232,716	.....	144,464					
1884 . . . . .		32,932	.....	18,440	2,446	395	243	295
End . . . . .	1,271,677	.....	144,620					
1885 . . . . .		31,483	.....	15,558	1,816	409	214	406
End . . . . .	1,315,656	.....	146,227					
1886 . . . . .		34,298	.....	19,215	1,585	271	181	565
End . . . . .	1,363,081	.....						
1887 . . . . .		30,336	.....	15,777	1,305	257	198	223
End . . . . .	1,415,269	.....						
1888 . . . . .		29,298	.....	15,076	1,018	201	188	364
End . . . . .	1,472,151	.....						
1889 . . . . .		34,460	.....	18,394	1,189	244	290	201
End . . . . .	1,528,721	.....						
1890 . . . . .		33,398	.....	17,680	1,492	298	143	441
End . . . . .	1,579,324	.....	164,370					
1891 . . . . .	1,601,327	.....		16,800	1,010	150	166	180
1892 . . . . .	1,656,715	32,696	172,378	16,319	1,325	58	137	217
1893 . . . . .	1,714,988	36,083	.....	.....	1,578	582	161	341
1894 . . . . .	1,655,235	30,961	176,200	14,649	1,361	443	69	208
1895 . . . . .	1,677,304	33,627	164,258	16,084	984	817	95	175
1896 . . . . .	1,696,313	30,578	.....	13,443	515	333	80	111
1897 . . . . .	1,758,885	30,632	58,339	13,825	507	217	71	161
1898 . . . . .	1,805,054	30,571	56,751	13,595	608	268	78	119

<sup>1</sup> Census of December 1, 1890.<sup>2</sup> Excluded: Still-born, 1,749, 1,771, 1,759, 1,707, 1,778, 1,848, 1,710, 1,761, 1,756, 1,789, 1,473

## Vienna, Austria.

YEARS.	Population.	Total Deaths.	Population of Children under 5 yrs. of age.	Deaths of Children under 5 yrs. of age.	Deaths from Diphtheria and Group.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880 .....	721,016	20,453	58,028	8,219	597	172	171	98
1881 .....	731,208	21,549	.....	8,224	539	288	171	106
1882 .....	740,919	21,595	.....	8,908	522	410	187	203
1883 .....	750,762	21,194	.....	7,930	360	150	157	246
1884 .....	759,849	20,353	.....	7,688	342	130	95	344
1885 .....	769,889	21,976	.....	8,668	464	83	106	289
1886 .....	780,066	20,869	.....	8,114	546	124	85	338
1887 .....	790,381	20,549	.....	7,912	455	391	80	493
1888 .....	800,836	20,349	.....	7,547	521	230	107	253
1889 .....	811,434	20,106	.....	7,624	513	139	103	364
1890 .....	822,176	20,324	69,710	7,853	536	92	77	459
1891 .....	1,378,530	34,479	130,808	15,610	1,311	271	85	855
1892 .....	1,406,933	35,134	.....	16,843	1,580	242	116	825
1893 .....	1,435,931	34,515	130,808	15,002	1,615	311	105	1,225
1894 .....	1,465,637	33,944	140,545	15,073	1,679	413	74	898
1895 .....	1,495,764	34,879	.....	15,021	710	437	86	754
1896 .....	1,526,623	34,132	.....	14,685	621	436	79	930
1897 .....	1,551,129	33,187	.....	13,946	575	236	84	857
1898 .....	1,590,295	32,356	.....	13,593	520	227	93	794

## Glasgow, Scotland.

YEARS.	Population.	Total Deaths.	Population of Children under 5 yrs. of age.	Deaths of Children under 5 yrs. of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1880 .....	.....	13,303	.....	6,071	150	453	278	331
1881 census...	511,415	12,909	69,931	5,386	162	256	166	333
1882 .....	.....	12,985	.....	5,972	177	263	162	213
1883 .....	.....	14,476	.....	6,494	132	449	167	605
1884 .....	.....	13,839	.....	6,174	157	412	184	335
1885 .....	.....	13,444	.....	5,156	112	288	102	430
1886 .....	.....	13,053	.....	5,601	111	345	81	90
1887 .....	.....	12,055	.....	5,367	174	234	100	302
1888 .....	.....	11,533	.....	4,743	168	163	59	205
1889 .....	.....	12,890	.....	5,970	167	109	111	594
1890 .....	.....	13,222	.....	5,768	139	124	108	583
1891 census...	565,710	14,149	72,481	5,432	131	201	123	400
1892 .....	669,069	15,128	84,860	6,306	162	304	102	781
1893 .....	677,883	15,798	85,968	6,953	208	263	120	855
1894 .....	686,820	13,674	87,103	5,326	245	204	150	250
1895 .....	695,876	16,332	88,250	6,458	112	180	121	330
1896 .....	705,052	14,388	89,413	6,153	83	139	139	814
1897 .....	714,419	15,727	90,665	6,750	97	132	172	574
1898 .....	724,349	15,333	91,861	6,530	103	188	223	536



**Liverpool, England.**

YEARS.	Population.	Total Deaths.	Population of Children under 5 yrs. of age.	Deaths of Children under 5 yrs. of age.	Deaths from Diphtheria.	Deaths from Scarlatina.	Deaths from Typhoid Fever.	Deaths from Measles.
1884 .....	541,031	14,382	.....	6,908	80	197	112	611
1885 .....	537,548	13,764	.....	6,213	133	190	95	716
1886 .....	534,088	13,919	.....	6,152	125	277	140	273
1887 .....	530,649	14,006	.....	6,218	95	321	130	661
1888 .....	527,233	12,159	.....	5,070	66	187	125	331
1889 .....	523,838	13,047	.....	5,921	57	332	167	485
1890 .....	520,466	14,293	.....	6,319	104	577	99	535
1891 ..	517,145	13,911	.....	5,697	63	119	92	320
1892 .....	513,818	12,671	.....	5,322	47	131	111	456
1893 .....	510,514	13,919	.....	6,035	47	231	221	273
1894 .....	507,230	12,073	64,544	5,214	65	232	248	299
1895 .....	638,291	16,215	78,411	7,201	97	168	192	397
1896 .....	632,512	14,617	.....	.....	157	227	206	306
1897 .....	644,129	15,590	78,411	6,972	91	209	145	344
1898 .....	668,645	15,380	.....	6,489	123	145	148	283

**DIPHTHERIA.**

The death-rate from diphtheria was greatest in 1876, 1880 and 1881.

In the quinquennial period ending with the year 1880, the death-rate was 17.38 to each 10,000 of the population; for the same period ending 1885 it was 15.46; in the next period, 1890, it was 12.09; and in the period ending 1895, it was 11.02. The greatest decrease is shown in the years 1896, 1897 and 1898, when the death-rates were respectively 9.80, 3.15 and 7.77 in each 10,000 of population. A diagram for the year 1898 is appended, which shows the number of deaths each month as compared with the average of ten years.

**GLANDERS AND RABIES.**

Cases of glanders and farcy amongst horses have continued to occur frequently, and have required unusual attention from the officer in charge of this work. Nights, Sundays and holidays are necessarily utilized to find large numbers of horses which require careful examination.

Rabies among dogs have occurred in five known instances and in twenty-four instances the dogs have been under strong suspicion of having been bitten by rabid dogs, and have been quarantined to wait developments.

The Legislature of 1897 passed an act by which the Boston Board of Health could act independently in cases of glanders, farcy and rabies, but omitted to provide us with the authority to isolate and quarantine cases of known exposure to these diseases. The present Legislature has been asked for additional authority, and there is every reason to believe that it will be given. A building for the quarantine of dogs, under suspicion of being infected with rabies, has been constructed in the rear of our hospital on Swett street. This building as now equipped has served our purpose during the last few months and may be sufficient for our purpose in the future.

#### DISINFECTION.

The work of disinfection has been continued as usual, with the following results:

		CASES.
Diphtheria . . . . .		1,712
Scarlet fever . . . . .		865
Measles . . . . .		111
Phthisis . . . . .		129
Small-pox . . . . .		—
Cancer . . . . .		17
Glanders . . . . .		141
Infected bedding, etc.,	Lots.	112
“ Clothing, etc.	“	116
“ Books, etc.	“	121
“ Schools . . . . .		17
“ Carriages . . . . .		19
Total . . . . .		3,360
Rooms disinfected . . . . .		6,939

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Streets.....			7	11	9	16	61	67	71	29	12	2	285
Places.....			15	41	53	139	201	197	185	102	31	19	963
Courts.....			11	18	27	115	187	112	109	86	24	11	700
Alleys.....			24	149	135	462	891	755	917	631	94	53	4,111
Yards.....	9	6	273	684	813	1,563	2,746	3,014	3,219	1,726	401	291	14,745
Vaults.....	10	8	14	43	87	91	210	189	141	101	34	19	947
Cellars.....	27	31	101	345	718	1,157	1,409	1,392	1,772	1,201	453	198	8,704
Gutters.....			12	155	187	308	986	1,262	1,975	904	314	73	6,176
Water-closets...	39	51	219	395	415	1,073	1,384	1,115	1,441	916	582	131	7,711
Passageways...		2	23	485	367	805	875	901	1,122	876	372	51	5,879
Urinals.....	5	7	11	9	41	47	126	113	117	44	31	11	662
Vacant lots.....			2	10	39	71	182	164	135	91	12	3	702
Filthy rooms...	216	252	203	321	307	232	217	199	252	236	293	297	3,075
Filthy sheds....	8	11	42	291	329	563	965	1,142	1,071	726	423	81	5,672
Sinks.....	102	119	151	698	771	1,184	1,974	2,043	2,185	1,511	761	481	12,076
Cesspools.....			29	495	673	1,292	1,963	3,117	3,253	2,031	219	95	13,177
Total.....	416	487	1,137	4,185	4,971	9,118	14,397	15,682	17,963	11,261	4,006	1,816	85,605

In the accomplishment of this work the following disinfectants have been used:

Brimstone used as an insecticide	.	.	.	.	.	.	.	.	.	.	.	.	1,525 lbs.
Formaldehyde	.	.	.	.	.	.	.	.	.	.	.	.	1,148 gals.
Alcohol	.	.	.	.	.	.	.	.	.	.	.	.	683 gals.
Chloride of lime	.	.	.	.	.	.	.	.	.	.	.	.	52,475 lbs.
Bichloride of mercury	.	.	.	.	.	.	.	.	.	.	.	.	875 lbs.
Muriatic acid (in mixing)	.	.	.	.	.	.	.	.	.	.	.	.	47 gals.
Copperas	.	.	.	.	.	.	.	.	.	.	.	.	740 lbs.

Table showing the Number of Nuisances Abated.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
House drains repaired..	274	171	257	126	129	203	113	175	192	193	178	126	2,137
Vaults cleaned and repaired.....	4	6	14	10	18	39	27	38	29	20	24	9	238
Traps supplied.....	122	66	87	44	37	118	57	73	81	88	60	63	896
Yards cleaned.....	38	36	179	119	92	125	68	119	72	38	46	54	986
Cellars cleaned.....	102	92	138	87	116	100	99	150	89	87	38	99	1,197
Cesspools cleaned.....	9	15	88	73	52	65	34	62	46	26	39	21	530
Water-closets cleaned and repaired.....	311	255	341	140	105	272	132	176	164	175	128	168	2,367
No. of places from which fowls were removed..	1	4	14	11	5	9	11	11	4	7	2	3	82
Supply pipes repaired.	4	16	7	16	14	8	12	17	10	11	2	13	130
Privies cleaned and repaired.....	.....	.....	.....	1	2	1	4	4	3	.....	.....	.....	15
General want of cleanliness and repairs....	35	32	41	28	27	30	23	42	23	17	27	71	396
Exposed manure.....	.....	1	5	4	1	2	2	4	6	1	1	4	31
Passageways cleaned..	10	11	70	51	27	68	56	66	35	23	11	24	452
Sheds cleaned.....	4	3	6	7	3	8	3	12	6	6	.....	2	60
Tenements white-washed.....	1	2	22	22	484	388	34	21	15	12	9	26	1,036
Stables cleaned.....	1	4	2	4	1	5	3	10	3	1	3	2	39
Sundry nuisances.....	11	19	26	11	10	28	21	34	18	16	40	20	254
Rain conductors repaired.....	6	4	5	6	2	4	15	12	9	8	1	5	77
Roofs repaired.....	2	4	4	5	1	6	6	11	3	7	2	4	55
Receptacles provided for garbage.....	.....	1	1	7	2	7	10	22	10	2	3	10	75
Places from which swine were removed.....	.....	3	.....	.....	.....	1	1	.....	.....	.....	2	.....	7
Stagnant water removed from vacant lots.....	.....	2	5	10	13	13	10	20	11	11	4	.....	99
Vacant lots cleaned....	4	2	12	2	16	10	9	13	4	8	2	3	85
Houses cleaned of dead rats.....	.....	1	1	.....	4	1	.....	1	1	.....	2	2	13
Overcrowded rooms....	3	3	1	3	.....	1	.....	1	1	.....	.....	1	14
Total.....	942	733	1,326	787	1,161	1,512	750	1,094	885	757	624	730	11,271

## REMOVAL OF OLD BUILDINGS.

In our last annual report we published an Act of the Legislature of 1897, that gave the Board of Health additional powers for the removal of old dwellings which had been vacated by the Board of Health on account of age, want of repairs, etc. Under this act there were ordered during the year the removal of fifty-eight dwellings, forty-eight of which have been already removed, and the remainder will be removed. This act did not empower the Board of Health to remove old dwellings which it had not vacated, while the need for such removals was as great as that for which the additional authority had been given in 1897. The amendment to the Act of 1897 has been asked for, and will undoubtedly be granted. The authority sought by this amendment will enable the Board of Health to remove many old worn-out buildings, which obstruct the light necessary for other buildings, and which foster and cover nuisances of various kinds to the injury of surrounding property. The Act of 1897 has been enforced only after personal inspection by the Board of Health and with the exercise of its judgment after considering the interests of all concerned. Damages for the removal of such buildings have been settled in thirteen cases, and forty-five cases remain for settlement at the end of this financial year. Following is a list of the houses ordered to be removed:

- \* 5 North Margin street court.
- \* 73, 89, 91-93 North Margin street.
- \* 3 Sun Court street.
- \* 2 North Brimmer place.
- \* 226 North street.
- \* Rear 224 North street.
- \* 29 Clark street.
- \* Rear 29 Clark street.
- \* Rear 37 Clark street.
- \* First and second house, rear 33 Clark street.
- \* 1 and 2 Bethel place.
- \* 12 South Margin street.
- \* 3 Gooch place.
- \* 6 and 8 East-street place.
- Second, third, fourth and fifth houses, rear 137 Beach street.
- \* Nos. 1, 2, 3, 4, 5, 6 and 7 Clifford street.
- \* 54 Cross street.
- \* Nos. 1, 2, 3, 4 and 5 Marion place.
- 92 Webster street.
- 6 Gilson court.

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\* Already removed.

First house, rear 44 Phillips street.

- \* Nos. 3½, 12, rear 12, and 16 Anderson street.
- \* 2 Carter place.
- \* 3 and 5 Commercial court.  
10 Webster avenue.
- \* First and second rear of 47 Pitts street.
- \* Second house rear 24 Norman street.
- \* Rear 18 and 20 Carver street.
- \* 410 Maverick street.
- \* Rear 14 Hanover avenue.
- \* 46 Salem street.

#### TENEMENT-HOUSES.

The law prescribes that tenement houses shall be examined twice in each year, but while this is well technically, we find it to be a necessary practice to examine such houses more frequently. Many of the tenement houses in our city were built for single families and have been converted to the use of three, four or more families. Rooms have been divided into small, dark and unventilated ones. Water-closets are put under the stairs, in the cellar, off hallways and in other dark places. Sinks are misplaced in the same way. Garbage, ashes and rubbish are frequently unprovided for except in unsuitable places. All this badly constructed and misused property is much sought for and completely satisfies a portion of our population, chiefly because of central location and the inherent desire of these people to herd together. Under the general law the Board of Health finds it possible to secure many changes in old buildings, and in some newly constructed ones, on the ground that they are otherwise unfit to occupy.

In addition to the old buildings demolished under the act of 1897, several have been taken down by the owners on account of radical changes which were demanded by the Board of Health, which improvements involved so considerable an expenditure that it was deemed more expedient to demolish the buildings. Among them were No. 216 and No. 218 North street, No. 28 South Margin street, and several houses on Fleet street. Upon the site of the dwelling demolished at No. 28 South Margin street there has been erected a new brick building, the rear part of which has been ordered vacant, because of insufficient light and ventilation.

In a number of cases additional light and ventilation has been secured by providing windows, air and light-shafts. Among the buildings so improved are 1359 Washington street, 28 and 28½ Norman street, 1st and 2d rear No. 20, South

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\* Already removed.

Margin street, Eaton place, rear 24 and 26 Tennyson street, 10, 20 and 22 Webster avenue, Washington place and Canney place.

Houses 109 Albany street and on Chapel place (from 93 Albany) and Bowling alley (from Beach street) have been vacated and will not again be occupied except for business purposes.

Among other improved conditions are the following:

Short hoppers and tanks substituted for pan and pressure-closets . . . . .	1,725
Water-closets abolished in cellars . . . . .	182
“ provided with light and ventilation . . . . .	272
“ new and additional . . . . .	198
T-joints removed and Y-joints substituted therefor . . . . .	306
Houses vacated . . . . .	207

#### LODGING-HOUSES.

It is gratifying to state that the regulations for the changes, outfit and care of cheap lodging-houses which were put in force by this department a year ago have been complied with by a majority of the owners and managers of such houses; where this has not been done the business has been abandoned. As a result of these changes our licensed lodging-houses, their equipment and patrons are cleanly, more orderly, and the latter less exposed to disease and vice.

#### GARBAGE AND REFUSE DISPOSAL.

The new plant for the reduction of garbage at Calf pasture, whose contemplated construction was mentioned in our last annual report, has been completed, and was put in operation November 15, 1898. It is too early yet to say whether or not it will be entirely successful, although it is the hope and expectation of all concerned that it will be so. Up to the date of this report there has been no complaint.

The plant for the treatment of dry rubbish has been erected at Fort Hill Wharf, at which all articles having a commercial value will be removed and prepared for the market and the residue burned. This plant is an assured success, and will be a credit to the city.

#### GAS-FITTING.

The examination for defective gas-fittings and pipes, begun by this department in 1897, has been continued during the last year with encouraging and successful results. Leaks of gas are more readily recognized and reported than formerly, and the evil results of living in an atmosphere mixed with illuminating gas are being better known.

During the year seventy-eight houses have been found with leaky gas-pipes or fixtures. These defects are repaired as rapidly as possible after being found. Less search for gas leaks by this department (aside from complaints) has been made the past year than was expected, owing to a weakened condition of our force of inspectors by sickness and otherwise. This force has been greatly strengthened, however, and more time will be given to this branch of our work during the coming year. It appears now to be definitely settled that the manufacture and supply of water gas will be discontinued within the next few months in favor of coal gas. Water gas means from 25 to 30 per cent. of carbonic oxide (a deadly poison), while coal gas should mean not more than 6 to 10 per cent. of this dangerous element. The number of deaths reported in Boston from this cause for the last six years, including accidental and suicidal, is as follows:

1893 . . . . .	25	1896 . . . . .	40
1894 . . . . .	33	1897 . . . . .	43
1895 . . . . .	28	1898 . . . . .	54

It is to be noted that there has been a constant and somewhat rapid increase in the number of deaths from this cause, and it is probably safe to say that for each death caused by illuminating gas there are 100 persons suffering more or less from the same gas issuing from defective or weak pipes and fixtures. The present legal requirements in this city that master and journeyman gas-fitters shall be examined and licensed before doing any gas-fitting work or business, and our regulations for proper materials and workmanship are repeatedly securing better construction, repairs and materials, and the community is being stirred to a belief in their importance and that the abolishment of water gas is a necessity.

The Board of Examiners for gas-fitters' licenses have met once a week during the year, and have made examinations as follows:

Number of applicants for licenses referred by Building Commissioner to Board of Examiners . . . . .	537
Number of notices forwarded by secretary for examinations . . . . .	589
Number of examinations held . . . . .	60
Number of applicants examined by Board . . . . .	400
Master . . . . .	182
Journeymen . . . . .	218
Number of applicants examined certified by Board to Building Commissioner for license . . . . .	142
Master . . . . .	81
Journeymen . . . . .	61



Number of examination papers rejected, applicant not receiving requisite percentage	258
Master	101
Journeyman	157

By the above statement it will be seen that the per cent. passing the masters' examinations was 44, while but 28 per cent. passed the journeymen's examinations.

Eleven oral examinations were given during the year, the candidates stating they were unable to read or write English.

#### EXAMINATION OF PLUMBERS.

During the year ending January 31, 1899, the Board of Examiners held fifty-one meetings, and examined 329 candidates for plumbers' licenses; 138 were for master plumbers' licenses and 67 (or 48 per cent.) passed the examination and were certified to the Building Commissioner for license. One hundred and ninety-one were examined for journeymen plumbers' licenses, and 127 (.669 per cent.) passed the preliminary examination and were notified to report at the shop for the practical test. Of this number 100 passed successful examinations at the shop and were certified for licenses.

There were in addition 64 candidates whose examination became necessary by a neglect to renew their licenses on May 1. Twenty-two of this number were masters and 42 journeymen. Three masters and six journeymen failed to pass the examination.

#### ALLEYWAYS.

Prior to April the Board of Health, under authority given in chapter 323, Acts of 1891, secured the paving and draining of such private alleyways as it found to be a menace to the public health and at the expense of the abutters. The duty of keeping the alleyway clean also devolved upon the abutters, although this duty was but rarely exercised except under compulsion.

The following private passageways were ordered paved:

March	5.	Keith's alley.
April	5.	Alley from 147 North to 58 Fulton streets.
May	9.	Lucas street, between Middlesex and Village streets.
August	8.	Oliver place, from 83 Essex street. Rear 627 to 635 Shawmut avenue. Rear of houses numbered 2 to 106 Sawyer street and 3 to 109 Kendall street.

- August 8. Oxford place, from 24 Harrison avenue.  
From 23 Norman street, between Oliver and Battery-march streets.  
Spear place, from 16 Pleasant street.  
Warrenton street to Pleasant street.
- August 24. Brighton avenue, from 105 Brighton street.  
Bennet place, from 42 Bennet street.  
Maple place, from Harrison avenue.  
May place, from Oak street.  
From 275 Congress street.
- November 9. Between Newbury and Boylston streets, from Gloucester street to the dead end.

An act of the Legislature of 1898 relieved the Board of Health of this duty, and placed the work of paving and draining the alleyways upon the Street Commissioners, and reads as follows:

[CHAPTER 298.]

AN ACT RELATIVE TO ALLEYS IN THE CITY OF BOSTON.

*Be it enacted, etc., as follows:*

SECTION 1. The Board of Street Commissioners of the city of Boston may, under the provisions of chapter three hundred and twenty-three of the acts of the year eighteen hundred and ninety-one and acts in amendment thereof or in addition thereto, lay out and construct any alley or passageway in the city of Boston not exceeding twenty-five feet in width as a public alley, and the provisions of said chapters shall, so far as applicable, apply to the laying-out and construction of public alleys and the paying of the assessable cost thereof, as if they were laid out as highways, and any moneys applicable to the laying-out and construction of highways under said act may be used for paying the expenses of laying-out and constructing public alleys.

SECT. 2. Said city shall not be liable for any defect or want of repair in any public alley, nor be required to keep the same free from snow, but shall be required to keep the same free from any substance which is liable to cause sickness or a nuisance.

SECT. 3. Whoever drops or places or suffers to remain in any public alley, any snow or ice, or any rubbish or obstruction of any kind, shall be fined not exceeding fifty dollars for each offence.

SECT. 4. This act shall take effect upon its acceptance by the City Council of the city of Boston. [*Approved April 18, 1898.*]

Pursuant to the above act the Board of Health, on June 25, sent the following communication to the Street Commissioners and turned over to said commissioners the following papers and agreements for paving and draining:

[COPY.]

HEALTH DEPARTMENT, OLD COURT HOUSE,  
BOSTON, June 25, 1898.*Board of Street Commissioners, City of Boston:*

GENTLEMEN, — Under an act of the Legislature of 1894 the Board of Health has proceeded to adjudicate upon the unsanitary condition of many of our alleyways, and order them paved and drained at the expense of the abutters. Since the passage of an act by the Legislature of 1898 which empowers the Street Commissioners to lay out and construct such passageways, and under which the paving and draining may be done by the Superintendent of Streets, the Board of Health believes that it would be better after adjudication by said Board to relinquish all the constructive work to your department.

The Board of Health, therefore, transmits to-day a list of such alleyways as have recently been found to require paving and draining, and will hereafter transmit such cases as may occur. The Mayor has been consulted in this matter, and has approved this action.

Very respectfully,

THE BOARD OF HEALTH,  
SAMUEL H. DURGIN, *Chairman.*

Since that date we have certified the following alleyways to be in need of the same treatment. It is an extremely important matter that those private ways which have been picked out as the worst should be put in order as soon as possible. They are serious nuisances, and in their unpaved and undrained condition it is impossible to keep them clean, and it is a hardship to the abutters who are willing and anxious to have them paved at their own expense under the direction of the city:

Willard place, off Washington street.

Willow park, off Shawmut avenue.

Camden place, off Washington street.

Charter place, off Shawmut avenue.

Passageway leading from Irvington street to Massachusetts avenue, between St. Botolph street and Huntington avenue.

Passageway leading from Tremont street to Shawmut avenue, between Upton street and Union Park street.

Chair alley, from Cross street.

India square.

Lovering place, off Washington street.

Andrews street, off Canton street.

Passageway between Dover and Dwight streets, from Shawmut avenue to Tremont street.

Export street.

## LABORATORY.

By consent of the Mayor, early last year, preparations were begun for the establishment of a laboratory for the Health Department, a need which had been felt for many years. In April a suitable room was secured in the Sudbury Building on Sudbury street. Dr. Hibbert W. Hill was appointed director of the proposed laboratory, and was at once put in charge of fitting up and equipping it. Everything being ready the work of diphtheria diagnosis was transferred from the laboratory at the Harvard Medical School to our own.

The diagnosis of diphtheria, typhoid fever, glanders, rabies, malaria, la grippe and other diseases are provided for. The analyses of suspected water and ice are also provided for, and will form a part of our future work. The laboratory is fitted and managed with a view of doing general and special research work. The production of diphtheria antitoxin was transferred to the State Board of Health in March, the horses used for this purpose at Gallop's Island sold and the guinea pigs and rabbits transferred to the new laboratory. It should be said that the cultural diagnosis of diphtheria and the production of diphtheria antitoxin was first, and for about three years, done at the laboratory of the Harvard Medical School by Professor Ernst most satisfactorily, and that its withdrawal from this laboratory to our own was but a part of our programme in the establishment of a laboratory for more extended uses.

The transfer of the antitoxin supply to the State Board of Health was due to an apt suggestion on its part to the effect that it might relieve Boston of the expense as well as the rest of the State.

For a more extended account of the work of the laboratory see the appended report of Dr. Hill.

## BOSTON MILK SUPPLY.

It is a well-known fact that while good milk is the most perfect and necessary article of diet, and a necessity for infants and young children, it is also the most likely of all food articles to become unclean or infected and dangerous. We have had, for many years, careful inspection of milk, to see that it is not so diluted with water or robbed of its cream as to cause its solids to fall below 12 per cent. in summer and 13 per cent. in winter. This inspection has served an important purpose, but it does not protect milk

against infection or uncleanness. In 1892 we passed the following regulation :

Cows.

Boston, April 26, 1892.

*Whereas*, Cows' milk is one of the most common and necessary articles of food, and is oftentimes seriously impaired in usefulness and rendered dangerous to health by the want of proper care in its production or subsequent treatment or handling; it is, therefore, ordered that the following regulation be and is hereby adopted :

SECTION 1. No person shall use any building as a stable for cows, unless it contains at least 1,000 cubic feet of space for each animal, is well lighted and ventilated, has tight roof and floors, good drainage, a supply of pure water, and all other necessary means for maintaining the health and good condition of the cows, and has been approved by the Board of Health.

SECT. 2. Every person using any such building shall keep the same and the premises connected therewith, and all land used for pasturage of the cows, clean and free from filth.

SECT. 3. Every person keeping a milch cow shall permit it to be examined from time to time, as to its freedom from disease, by a veterinarian designated by the Board of Health.

SECT. 4. No person having an infectious disease, or having recently been in contact with any such person, shall milk cows or handle cans, measures, or other vessels used for milk intended for sale, or in any way take part or assist in handling milk intended for sale, until all danger of communicating such disease to other persons shall have passed.

SECT. 5. No person shall sell or use for human food the milk of a diseased cow, or permit such milk to be mixed with other milk, nor until it has been boiled, shall sell or use such milk, or any mixture of such milk, for food of swine or other animals.

In the enforcement of this regulation it became necessary to condemn and remove a large number of old and unsuitable stables. Other stables were rearranged and improved so that cows have been somewhat better cared for in Boston. It was seen, however, that this regulation was but a step in the right direction, and that regulations upon a more comprehensive scale must be made and enforced if we would secure wholesome and safe milk for this city and for the State. Use was made of the Massachusetts Association of Boards of Health, in which a committee was appointed to formulate a set of regulations which would be approved by the association and adopted by all of the Boards of Health of the State. The regulations were prepared and accepted by the association. The Legislature of 1897 was asked to give the other Boards of Health of the State the appoint-

ment and aid of the milk inspectors, but the Legislature failed to sympathize with the Boards of Health in this movement, and the matter fell through for the time being. In December last this Board, having ample authority for the purpose, and after making slight changes, adopted the regulations in the following form :

*Whereas*, In the opinion of the Board of Health of the city of Boston, infectious diseases are spread by the distribution of milk produced, stored and distributed under improper conditions ; it is therefore,

*Ordered*, That the following regulations be, and hereby are, adopted :

#### ARTICLE I.

SECTION 1. All persons in the city of Boston engaged in the production of milk for sale, or in the business of selling, delivering or distributing milk in said city, shall, annually on the first day of May, or within thirty days thereafter, make written application to the Inspector of Milk, on forms prescribed by the Board of Health, for a license.

SECT. 2. No person in said city shall engage in the business of producing milk for sale, or in the sale or distribution of milk in the city of Boston, without a license so to do, under these regulations and such other conditions as the Board of Health may impose ; said license to be revoked if the licensee fails to comply with the conditions of his license or the regulations of this Board.

SECT. 3. The conditions under which every cow is kept whose milk is brought into the city of Boston, or kept, delivered, distributed, sold or offered for sale in said city, shall be made known by the licensee to the Inspector of Milk in such detail as the Board of Health may require, and shall be approved by said Board ; and no milk except that derived from such cow shall be brought, kept, delivered, distributed, sold or offered for sale in said city.

SECT. 4. No milk shall be sold, offered for sale, or distributed in the city of Boston unless the cows from which it is derived have, within one year, been examined by a competent authority, and shown to be free from diseases dangerous to the public health ; but this shall not be construed as forbidding the sale or use of milk from cows not tested with tuberculin.

SECT. 5. All persons having a permit or license to sell, deliver or distribute milk in the city of Boston, shall keep a copy of the license constantly posted in a conspicuous place on the premises, and shall have his name and the number of his license marked in plain uncondensed Gothic letters, not less than one inch in height, on vehicles used by him in the conveyance and sale of milk.

#### ARTICLE II.

SECTION 1. No milk for sale or distribution shall be stored in that portion of a building which is used for the stabling of horses,

cows or other animals, or for the storing of manure, or in any room used in whole or in part for domestic or sleeping purposes.

SECT. 2. No person in the city of Boston engaged in the business of producing milk for sale, and no person engaged in the business of storing or delivering milk in said city, shall store, cool or mix said milk in any room which is occupied by horses, cows or other animals. All rooms in which milk is stored, cooled or mixed shall be provided with tight walls and floor and kept constantly clean. The walls and floors of said rooms to be of such a construction as to allow easy and thorough cleansing. The room or rooms aforesaid shall contain proper appliances for washing or sterilizing all utensils actually employed in the storage, sale or distribution of milk, and all such apparatus and utensils shall be washed with boiling water or sterilized by steam regularly after being so used.

SECT. 3. No urinal, water-closet or privy shall be located in the rooms called for in the preceding section, or so situated as to pollute the atmosphere of said rooms.

SECT. 4. All milk produced in the city of Boston for sale shall be strained, cooled or stored as soon as it is drawn from the cow.

### ARTICLE III.

SECTION 1. Milk kept for sale in any store, shop, restaurant, market, bakery or other establishment, shall always be kept in a covered cooler, box or refrigerator, properly drained and cared for, and while therein shall be kept tightly closed and only in such locations and under such conditions as shall be approved by the Board of Health.

### ARTICLE IV.

SECTION 1. All cans, bottles or other vessels of any sort, used in the retail sale, delivery or distribution of milk to the consumer, must be cleaned or sterilized before they are again used for the same purpose, and it shall be deemed a sufficient reason for forfeiture of license for any milk dealer to fail so to do.

SECT. 2. No person shall use in any way a milk vessel for any other substance than milk, and any licensed milk dealer who shall so misuse such vessel shall be liable to forfeiture of license.

### ARTICLE V.

SECTION 1. Every person engaged in the production, storage, transportation, sale, delivery or distribution of milk shall immediately on the occurrence of any case or cases of infectious disease either in himself or in his family, or amongst his employees or within the building or premises where milk is stored, sold or distributed, notify the Board of Health, and at the same time shall suspend the sale and distribution of milk until authorized to resume the same by the Board of Health. No vessels which have been handled by persons suffering from such diseases shall be used to hold or convey milk until they have been thoroughly sterilized.

The following blanks were prepared and are being sent to all of the milk producers for Boston, in Maine, New Hampshire, Vermont, Massachusetts and Rhode Island :

[Form 42.]

**APPLICATION FOR LICENSE TO SELL MILK IN THE CITY OF BOSTON, DURING THE YEAR, ENDING MAY 31, 1900.**

Name of applicant,  
Residence (street and number, town),  
Place of business,  
Number of wagons used in delivery of milk,  
Number of drivers employed,

NAMES OF DRIVERS.	RESIDENCES.

Section supplied,  
Amount of milk raised (quarts),  
Number of cows kept,  
Amount of milk bought (quarts),  
Of whom bought,  
Where delivered by him,  
Hour delivered,                      A. M.                      P. M.  
Where stored and handled after delivery,  
Whether mixed, handled, or stored where cows, horses, or other animals are kept, or where manure is stored,  
Whether mixed, handled, or stored in rooms used for domestic purposes or sleeping rooms,  
Location of milk-room,  
How drained,  
Whether walls are tight and easily cleaned,  
Whether floor is tight and easily cleaned,  
Whether appliances are at hand for washing or sterilizing all utensils,  
Whether any water-closet, urinal, or privy is located in the room,  
Whether ice-box or refrigerator drained, and how,  
The above is a correct statement.

} If any, fill out Form 43.

Signature,

Witness,  
Boston,  
License Issued,  
Number of License, \_\_\_\_\_

[Form 43.]

**APPLICATION FOR REGISTRATION AS A DEALER IN MILK AND FOR LICENSE TO SELL MILK IN A STORE IN THE CITY OF BOSTON.**

Name of applicant (if a partnership, the name and address of each member must be given).

Residence,  
Residence,

Kind of store (bakery, provisions, groceries, etc.),

Place of business, No.

Street.

District,

Amount sold per day (quarts),

From whom purchased,

Time received,



Whether kept in a separate covered cooler or refrigerator,  
 Whether cooler or refrigerator is drained, and how,  
 Where and how the measures are washed,  
 Whether there is a urinal or water-closet in the store,  
 Whether any part of the store is used for domestic purposes or as a  
 sleeping-room,

The above is a correct statement.

Signature,

Witness,  
 Boston,  
 License issued,  
 Number of License,

[FORM 44.]

#### CONDITION OF PREMISES.

Statement of conditions under which cows are kept, and milk there-  
 from stored, on the premises of \_\_\_\_\_ at \_\_\_\_\_,  
 said milk being supplied by \_\_\_\_\_ (Town.)  
 to \_\_\_\_\_ (State.) for sale in the city of Boston, Mass.

#### STABLE.

Number of cows kept, \_\_\_\_\_ Approximate air-space per  
 cow, \_\_\_\_\_  
 Whether cow stable is well lighted,  
 Whether cow stable is well ventilated,  
 How drained,  
 Condition of floor,  
 Whether manure is stored in cellar,  
 If not in cellar, where stored?

#### MILK-ROOM.

Whether milk is cooled, mixed or stored where cows or other animals  
 are kept, or where manure is stored,  
 Whether cooled, mixed or stored in rooms used for domestic pur-  
 poses or sleeping-rooms,  
 Location of milk-room,

Whether walls are tight and easily cleaned,  
 Whether floor is tight and easily cleaned,  
 Whether appliances are at hand for washing or sterilizing all utensils,

Whether any water-closet, urinal, or privy is located in the room,

#### CONDITION OF COWS.

Date of last examination of cows,  
 By whom examined,  
 Number examined,  
 Whether any cows were found to be diseased,

Whether any cows have been added since, and if so, how many?  
 Whether added cows were examined, and if so, when and by whom?

#### SHIPMENT OF MILK.

Amount of milk shipped,  
 To whom shipped,  
 How shipped,  
 Marks on cans,

The above is a correct statement.

Signature,

Address,

Witness,  
 Date,

These blanks are required to be filled out, returned and approved by the Board of Health before a license is issued to the contractor to bring into and sell milk in the city of Boston. A clean and healthful condition of cows, their enclosures, all vessels used for, and all persons who handle or deal in milk, its timely and proper cooling and general care, are needed and demanded in the interest of public health, and to this end carefully prepared and explicit instructions are being sent to all persons engaged in producing or handling milk intended for sale in Boston. It will require a little time to secure the necessary understanding and to fix all responsibilities where they belong in so large a field of producers, contractors, pedlers and other dealers, but we entertain no doubt of success in the undertaking.

#### SCHOOL-HOUSES.

The examination of school-houses has been continued with about the same results as have been reported from year to year for the last twenty-five years. There has been an improvement in some respects in the sanitary condition and appointment of the houses, but it has been slow and not general. Better sites have been selected, better construction and more space given new houses. Some diversified changes have been made in old ones, but there still exist many overcrowded, badly ventilated, badly drained houses with overheated or underheated air as may happen. The general sanitary conditions of school-houses have been the subject of repeated communications from this department to the City Council and School Committee for many years. Some of the more urgent cases have been especially communicated during the last year as has been done in previous years.

#### MEDICAL INSPECTION OF SCHOOLS.

The medical inspection of schools has been continued. The following tables show the work performed by the inspectors:

##### TABULATION OF THE WORK OF THE MEDICAL INSPECTORS OF SCHOOLS FOR THE YEAR 1898.

Specific Infectious Diseases	.	.	.	.	.	275
Oral and respiratory	.	.	.	.	.	2,722
Diseases of the ear	.	.	.	.	.	102
“ “ eye	.	.	.	.	.	402
<i>Carried forward</i>	.	.	.	.	.	<hr/> 3,501

<i>Brought forward</i> . . . . .	3,501
Diseases of the skin . . . . .	16,709
Miscellaneous diseases . . . . .	2,912
	<hr/>
	23,122
Negative examinations for pediculi . . . . .	16,880
	<hr/>
	40,002
Number of pupils examined in the schools . . . . .	50,991
Number recommended to be sent home . . . . .	7,896
Number consultations with teachers (about pupils re- turning to school, etc.) . . . . .	1,783

### CLASSIFICATION OF DISEASES FOUND IN THE SCHOOLS.

<b>I. SPECIFIC INFECTIOUS DISEASES.</b>		<b>6. Naso-Pharynx.</b>	
Diphtheria.....	8	Naso-pharyngitis (post-nasal catarrh).....	41
Scarlet fever.....	16	Adenoid disease.....	36
Measles.....	26		
Whooping-cough.....	96	<b>7. Larynx.</b>	
Mumps.....	31	Acute laryngitis.....	19
Chicken-pox.....	65	Chronic laryngitis.....	1
Influenza and "grip".....	20		
Syphilis.....	1	<b>8. Bronchi.</b>	
Tuberculosis.....	9	Acute bronchitis.....	177
Malaria.....	5	Chronic bronchitis.....	3
Meningitis.....	1		<hr/>
	<hr/>		2,722
	275		
<b>II. DISEASES OF THE ORAL AND RESPIRATORY TRACT.</b>		<b>III. DISEASES OF THE EAR.</b>	
<b>1. Mouth.</b>		Foreign bodies (cerumen, etc.).....	2
Stomatitis.....		Otitis media, catarrhal (acute)	2
(a) Simple (erythematous)	6	" " " (chronic)	2
(b) Aphthous (herpetic)...	1	Otitis media, suppurative (acute).....	12
(c) Ulcerative.....	1	Otitis media, suppurative (chronic).....	63
Alveolar abscess.....	36	Imperfect hearing (without visible cause).....	19
		Unclassified.....	2
<b>2. Pharynx.</b>			<hr/>
Acute pharyngitis.....	724		102
Hypertrophic pharyngitis (acute and chronic).....	55		
<b>3. Tonsils.</b>		<b>IV. DISEASES OF THE EYE.</b>	
Acute follicular tonsillitis..	1,189	<b>1. Foreign Bodies.</b>	
Hypertrophic tonsillitis....	345	<b>2. Eyelids.</b>	
Abscess.....	2	Blepharitis.....	27
<b>4. Uvula.</b>		Stye.....	12
Elongation.....	9	Ptosis.....	1
<b>5. Nose.</b>			
Acute rhinitis.....	46	<b>3. Lachrymal Organs.</b>	
Chronic rhinitis.....	6	Obstruction of duct.....	3
Purulent rhinitis.....	4		<hr/>
Ozaena.....	7		43
Epistaxis.....	14		

4. <i>Conjunctiva.</i>			Tinea, favosa . . . . .	14
Conjunctivitis.			Tinea, trichophytina . . . . .	91
(a) Acute catarrhal . . . . .	142		Tinea, versicolor . . . . .	2
(b) Purulent . . . . .	3		Urticaria . . . . .	39
(c) Phlyctenular . . . . .	13		Verruca . . . . .	24
(d) Granular . . . . .	28			<hr/>
5. <i>Cornea.</i>				16,709
Interstitial keratitis . . . . .	2		VI. MISCELLANEOUS DISEASES.	
Ulcer . . . . .	9		Anæmia . . . . .	69
Opacity . . . . .	1		Debility . . . . .	105
6. <i>Iris.</i>			Headache (habitual) . . . . .	181
Iritis . . . . .	3		Cervical adenitis . . . . .	119
7. <i>Muscles.</i>			Chorea . . . . .	18
Strabismus . . . . .	24		Ulcer . . . . .	20
Imperfect sight (without visible cause) . . . . .	127		Deformities, spinal extremities . . . . .	16
Unclassified . . . . .	7		Sprains . . . . .	20
	<hr/>		Fractures . . . . .	4
	402		Contusions . . . . .	68
V. DISEASES OF THE SKIN.			Wounds . . . . .	46
Acne . . . . .	26		Abscess . . . . .	31
Alopecia areata . . . . .	13		Dental caries (painful) . . . . .	26
Dermatitis . . . . .	42		Neuralgia . . . . .	19
Eczema . . . . .	359		Epilepsy . . . . .	12
Erythema simplex . . . . .	8		Rheumatism . . . . .	22
Furunculus . . . . .	41		Cardiac diseases . . . . .	8
Herpes, simplex . . . . .	55		Gastric diseases . . . . .	99
Herpes, zoster . . . . .	5		Intestinal diseases . . . . .	19
Impetigo contagiosa . . . . .	96		Urinary diseases . . . . .	17
Pediculosis . . . . .	15,823		Vaccinations (performed) . . . . .	260
Pemphigus . . . . .	1		Certificates of vaccination . . . . .	1,142
Pityriasis maculata et circinata . . . . .	1		"No disease" . . . . .	223
Psoriasis . . . . .	7		Unclassified . . . . .	68
Scabies . . . . .	34			<hr/>
Seborrhoea . . . . .	28			2,912
			Also negative examinations for pediculi . . . . .	16,880

Following is a list containing the names of the Medical Inspectors of schools and the stations where culture tubes may be procured, January 31, 1899.

#### MEDICAL INSPECTORS OF SCHOOLS.

- J. L. Ames, 72 Chestnut street, Brimmer School, Kindergarten, Parochial, Fayette-street School.
- H. D. Arnold, 188 Warren street, Roxbury High School, Lewis Grammar School, Primary, Quincy street; Primary, Monroe street; Primary, Winthrop street, Primary and Kindergarten, Warren street.
- S. H. Ayer, 318 Shawmut avenue, Franklin, Waite, Cook, Parochial Cathedral, German Parochial.
- W. B. Bancroft, 597 Broadway, Hart, Capen, Bird, Parochial, Kindergarten.
- F. E. Bateman, 372 Main street, Harvard, Harvard Primary and Common street Primary.

- J. P. Broidrick, 67 South street, J. P., West Roxbury High, Creighton street, Leo XIII. Parochial.
- J. S. Brownrigg, 16 Delle avenue, Parochial, Kindergarten.
- W. S. Boardman, 57 Hancock street, Eliot, Ware, Freeman, Parmenter, North Bennet Kindergarten.
- J. E. Butler, 310 Warren street, George Putnam, St. Joseph Parochial, St. Francis Parochial.
- A. B. Coffin, 555 Washington street, Dorchester High, school in store on Washington street, Gibson on School street, Gibson on Morse street, Atherton, Glenway Primary, Glenway Kindergarten.
- R. M. Cole, 456 Broadway, Shurtleff, Lincoln, Clinch and Burnham.
- D. A. Collins, 11 Parmenter street, St. Mary's-Parochial, St. Stephen's Parochial, Moon-street Public.
- G. A. Craigin, 18 Hereford street, Hancock, Cushman, Parmenter-street Kindergarten, Sheafe street and Moon street.
- J. T. Cutler, 624 Warren street, Edward Everett, Harbor View, Savin Hill and Athenæum.
- Charles G. Dewey, 539 Talbot avenue, Minot, Bailey-street Primary, Henry L. Pierce.
- J. W. Dewis, 579 Tremont street, Mt. Pleasant avenue, Yeoman street, Dearborn, Eustis street.
- John Duff, 5 Dexter row, Warren, Mead street, Cross street and Charlestown High.
- D. G. Eldredge, 15 Monadnock street, Mather, Quincy-street Primary.
- Theo. C. Erb, 551 Columbus avenue, Everett, Dwight, Rutland, Concord, Joshua Bates.
- C. A. Ewald, 94 Charles street, Wells, Winchell, Poplar street, North Russell street, Chambers-street Primary, Chambers-street Kindergarten.
- Wm. H. Ensworth, 7 Chelsea street, E. B. Adams, Plummer Primary and Assumption Parochial schools.
- Wm. E. Fay, 571 Tremont street, Hyde, Sherwin, Leon-street Branch, Parker-street Branch, Day Nursery.
- Wm. H. Grainger, 408 Meridian street, Chapman, Tappan, Parochial.
- E. M. Greene, 49 Hancock street, Bowdoin, Somerset, Sharp, Phillips, Grant, Baldwin on Chardon street.
- J. S. Greene, 1107 Washington street, Dor., Gilbert Stuart, Morton-street Primary, Stoughton, Tileston, Adams-street Primary.
- F. A. Higgins, 22 Marlboro' street, Quincy, Winthrop, Primary, Way street; Primary, Genesee street; Primary, Tyler street; Dennison Kindergarten.
- E. M. Holden, 203 Huntington avenue, Comins, Martin.
- F. C. Jillson, Hastings street, W. Roxbury, Robert G. Shaw, Mt. Vernon street, Baker street.
- A. S. Knight, 295 Beacon street, Frothingham, Moulton-street Primary.

- J. S. H. Leard, 16 Weld Hill street, Agassiz, F. H. Primary, Margaret Fuller Primary, Bowditch, Hillside Primary, Chestnut avenue.
- Wm. J. McNally, 31 Monument square, Prescott, Medford-street Primary, Polk-street Primary.
- R. M. Merrick, 15 Adams street, Harris School, Dorchester-avenue Primary, Henry L. Pierce, Thetford-avenue Primary, Lauriat-avenue Kindergarten.
- H. E. Marion, 5 Sparhawk street, Brighton High, Bennett Grammar and Annex, Winship Primary, Union-street Primary and Kindergarten.
- O. H. Marion, 22 Harvard avenue, Harvard, Everett, Allston, Webster.
- G. P. Morris, 599 Broadway, Andrew, Ticknor, Roger Clap.
- T. J. Murphy, 372 Dudley street, Hugh O'Brien, George-street Primary, Howard avenue, St. Patrick's Parochial.
- J. F. O'Brien, 401 Bunker Hill street, Bunker Hill Grammar, Parochial.
- E. F. O'Shea, 5 Chelsea street, E. B., Lyman, High, Cudworth, Fitton.
- H. L. Plummer, 696 Saratoga street, Emerson, Noble, Chapel on Bennington, Blackinton and Star of the Sea.
- J. C. D. Pigeon, 130 Warren street, Dudley, Dillaway.
- H. S. Rowen, 237 Market street, Bennett, Oak-square Primary, Warren Grammar, Faneuil Primary, St. Joseph's Academy, Allston, Auburn Primary.
- J. H. Sherman, 534 Broadway, Bigelow, Hawes, Simonds.
- C. M. Smith, 15 Charles street, Horace Mann, Prince, Perkins.
- Henry B. Stevens, Centre corner Park street, Longfellow, Charles Sumner.
- F. W. Stuart, 550 Broadway, Norcross, Cyrus Alger, Drake.
- W. F. Temple, 240 Huntington avenue, Rice, Boys' Latin, Boys' High, Girls' Latin, Girls' High.
- E. A. Tracy, 99 Broadway, Lawrence, Mather, Howe, Parochial.
- A. H. Tompkins, 20 Seaverns avenue, J. P., Lowell, Wyman street, Lucretia Crocker, Heath street, Centre street, Sunnyside street, Baptist Chapel, Marcella-street Home.
- H. F. R. Watts, 372 Dorchester, Gaston, Tuckerman, Pope, Kindergarten.

## DIPHTHERIA CULTURE STATIONS.

For the convenience of physicians, boxes containing culture tubes may be obtained of the following apothecaries :

- B. F. Stacey, 4 Thompson square, Charlestown.
- G. H. Alexander, 100 Dorchester street, South Boston.
- A. H. Copley, 45 Hancock street, Dorchester.
- C. B. Rogers & Co., 701 Centre street, Jamaica Plain.
- L. D. Drury, corner Warren and Dudley streets, Roxbury.
- S. A. D. Shepard & Co., 1129 Washington street, city.

A. W. Tilton, 71 Prince street, city.  
 G. B. Squire, 65 Cambridge street, city.  
 Henry Canning, 57 Chambers street, city.  
 R. H. Billings, 1439 Dorchester avenue, Dorchester.  
 W. D. Wheeler, corner Massachusetts avenue and Beacon street, city.  
 W. D. Wheeler, 393 Cambridge street, Allston.  
 Fred W. Archer, Washington street, Milton Lower Mills.  
 S. T. Jeffers, 728 South street, Roslindale.  
 C. J. Countie & Co., 23 Charles street, city.  
 E. Woods, 281 Centre street, Jamaica Plain.  
 F. W. Moore, 377 Cambridge street, Brighton.  
 G. W. Warren, 343 Washington street, Brighton.  
 T. T. Reed, 3101 Washington street, Egleston square.  
 F. O. Swallow, Centre street, West Roxbury.  
 F. M. Loring, 122 Harvard street, Dorchester.  
 Frank S. Colley, 610 Tremont street, city.  
 Clark & Mahoney, 77 Saratoga street, East Boston.  
 Theodore Metcalf, 39 Tremont street, city.  
 Theodore Metcalf, Copley square, city.  
 Bacteriological Laboratory, 607 Sudbury Building, corner Hawkins and Sudbury streets.  
 Connolly & Davis, 1436 Dorchester avenue, 764 Washington street, Dorchester, and 764 Walnut street, Neponset.

There have been 165 applications for the occupancy of stables, acted upon as follows:

Granted	.	.	.	.	.	.	.	.	.	127
Refused	.	.	.	.	.	.	.	.	.	19
Applications withdrawn	.	.	.	.	.	.	.	.	.	8
Awaiting action	.	.	.	.	.	.	.	.	.	8
Dropped for failure to comply with requirements	.	.	.	.	.	.	.	.	.	8

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165

#### LYING-IN HOSPITALS.

During the year 376 confinements have taken place in the licensed hospitals, and no deaths have been reported.

These hospitals have been regularly visited and inspected by the Medical Inspector.

The following is a list of the places so licensed:

Union General Hospital, 158 West Springfield street.  
 Mrs. Lora Hunter, 2 Brookline avenue.  
 Dr. John W. Johnson, 20 Worcester street.  
 Talitha Cumi Home, 206 West Brookline street.  
 St. Mary's Infant Asylum, Cushing avenue, Dorchester.  
 New England Hospital, Dimock street, Roxbury.  
 Mrs. Drusilla Smith, 83 Appleton street.  
 New England Deaconess Home, 691 Massachusetts avenue.

Mrs. Sarah F. Murch, 450 Shawmut avenue.  
Maria McBride, 65 Worcester street.  
Mrs. Marsenia C. Russell, 205 West Springfield street.  
Mrs. C. H. Parker, 263 Shawmut avenue.  
Tersah E. Goodwin, 4 La Grange street.  
Mrs. Mary A. Haley, 934 Fourth street.  
Mrs. George S. White, 192 Poplar street, Roslindale.  
E. A. Harvey, 18 Neponset avenue.

## UNDERTAKERS.

Appointed annually by the Board of Health in accordance with  
Pub. Stat. 1890, chap. 210, sect. 1.

## LIST OF UNDERTAKERS, CITY OF BOSTON.

Abrams, Barnett, 4 Williams-street terrace, Roxbury.  
Alexander, Alexis, 100 Wayland street, Dorchester.  
Avdon, Michael, 67 Salem street, Boston.  
Badaracco, Andrew A., 11 North Bennet street, Boston.  
Balfe, Thomas J., 258 Broadway, South Boston.  
Banks, Walden, 170 Cambridge street, Boston.  
Barry, Michael, 371 Harrison avenue, Boston.  
Belgard, Philip, 15 Arnold street, Roxbury.  
Bennison, Charles E., Gladstone street, East Boston.  
Bernstein, Morris H., 26 Parmenter street, Boston.  
Brady, Patrick J., 177 Green street, Jamaica Plain.  
Briggs, Frederick L., 20 Howard street, Boston.  
Brown, Charles R., 584 Dudley street, Roxbury.  
Brown, Edwin G., 232 Meridian street, East Boston.  
Brown, Frank E., 252 Meridian street, East Boston.  
Bryant, John E., 15 Austin street, Charlestown.  
Bryant, T. Weston, 15 Austin street, Charlestown.  
Burke, Edmund C., opp. Jamaica Plain Station, Jamaica Plain.  
Burke, John B., 75 Chambers street, Boston.  
Callahan, Timothy F., 52 Warren street, Charlestown.  
Cangiano, Michael, 212 North street, Boston.  
Caro, Solomon M., 19 Catawba street, Roxbury.  
Casey, Francis P., 56 Warren street, Roxbury.  
Cassidy, William J., 120 Harrison avenue, Boston.  
Chester, Charles E., Trinity Church, Boston.  
Clark, William C., Long Island.  
Cleary, J. P., 5 Pynchon street, Roxbury.  
Cobb, Charles W., 99 Main street, Charlestown.  
Cobb, Frank L., 97 Hyde Park avenue, Jamaica Plain.  
Colbert, Charles E., 144 Harrison avenue, Boston.  
Cole, George S., 306 Broadway, South Boston.  
Cole, Harry H., 9 Hancock street, Dorchester.  
Connell, Austin H., 815 Albany street, Roxbury.  
Cosmo, M. J., 12 Battery street, Boston.  
Costello, W. P., 129 Shawmut avenue, Boston.



Crane, F. E., 565 Tremont street, Boston.  
Crane, Horace R., 25 Walnut street and 1859 Dorchester avenue,  
Dorchester.  
Crogan, James P., 87 Chelsea street, Charlestown.  
Crosby, Elizabeth A., 10 Warren street, Roxbury.  
Crosby, Joseph P., 100 Hampden street, Roxbury.  
Dacey, C. M., 82 Main street, Charlestown.  
Dolan, James W., 1380 Dorchester avenue, Dorchester.  
Donovan, Patrick J., 1930 Washington street, Roxbury.  
Dooley, David J., 147 London street, East Boston.  
Doolin, John, 211 Third street and 245 Dorchester street, South  
Boston.  
Doyle, Thomas, 2212 Washington street, Roxbury.  
Eastman, Alman L., 251 Tremont street, Boston.  
Everett, George E., 614 East Broadway, South Boston.  
Fallon, John D., 736 Centre street, Jamaica Plain.  
Farrell, Michael A., 1336 Tremont street, Boston.  
Feeley, Thomas, 128 Freeport street, Dorchester.  
Feeney, John, 364 Hanover street, Boston.  
Field, George V., 214 Dorchester street, South Boston.  
Fitzgibbon, Edward D., 1345 Dorchester avenue, Dorchester.  
Gallivan, Joseph C., 204 Broadway, South Boston.  
Gilmore, Edward J., 1455 Tremont street, Boston.  
Gleason, E. F., 345 Washington street, Dorchester.  
Gleason, R., 345 Washington street, Dorchester.  
Glidden, Charles S., 482 Dudley street, Dorchester.  
Gridley, W. A., 225 Lamartine street, Jamaica Plain.  
Guggenheim, Joseph, 111 West Brookline street, Boston.  
Harrigan, Daniel P., 365 Warren street, Roxbury.  
Hatch, Henry S., Centre, near Green street, Jamaica Plain.  
Haynes, James, 3088 Washington street, Roxbury.  
Hill, George, South street, Roslindale.  
Hogue, Alphonse, 10 Isabella street, Boston.  
Jacobovitz, Myer, Centre street, West Roxbury.  
Jacobs, Louis, 110 Pleasant street, Boston.  
Jones, Lewis L., 50 La Grange street, Boston.  
Keating, Thomas J., 322 Bunker Hill street, Charlestown.  
Kelly, Bernard, 310 Bowdoin street, Dorchester.  
Kelly, Michael J., 37 Maverick square, East Boston.  
Kelly, Thomas J., 1449 Tremont street, Roxbury.  
Kennedy, P. T., 11 North Bennet street, Boston.  
King, Robert J., 80 Endicott street, Boston.  
Lane, Thomas J., 120 Havre street, East Boston.  
Langone, Joseph A., 218 North street, Boston.  
Lavery, Frank W., 54 A street, South Boston.  
Lavery, John W., 54 A street, South Boston.  
Leary, Lewis W., 146 Broadway, South Boston.  
Linnehan, C. P., 98 Kneeland street, Boston.  
Lippa, William, 19 Stillman street, Boston.  
Maloney, Frank S., 123 Maverick street, East Boston.  
Mann, Lewis A., 145 Dudley street, Roxbury.

Marsh, W. W., 475 Cambridge street, Brighton.  
Mannheimer, Herman, 1623 Washington street, Boston.  
McCaffrey, Christopher P., 75 Albany street, Boston.  
McCaffrey, John, 75 Albany street, Boston.  
McCarthy, Marcus B., 119½ Pleasant street, Boston.  
McCartney, Timothy, 328 Bunker Hill street, Charlestown.  
McCugh, Hugh, Roslindale.  
McMackin, Bernard, 80 Bunker Hill street, Charlestown.  
Metcalf, Eugene H., 24 Franklin street, Allston.  
Mitchell, M. J., 324 Bunker Hill street, Charlestown.  
Morris, Jerome S., 165 London street, East Boston.  
Morris, John, London street, corner Porter street, East Boston.  
Morris, John J., corner London and Porter streets, East Boston.  
Muldoon, Joseph L., Market street, Brighton.  
Mullen, James, 84 Charlestown street, Boston.  
Mullen, M. J., 650 Broadway, South Boston.  
Mullen, Patrick H., 650 Broadway, South Boston.  
Murphy, Michael J., 428 Hanover street, Boston.  
Murray, E. A., 29 Thacher street, Boston.  
Nolan, John E., 380 Broadway, South Boston.  
O'Donnell, James F., 204 Broadway, South Boston.  
Peak, John H., 1374 Washington street, Boston.  
Peak, John H., Jr., 1374 Washington street, Boston.  
Rafferty, Patrick H., 60 Chambers street, Boston.  
Rafferty, Thomas E., 1034 Tremont street, Roxbury.  
Reade, George E., 187 Main street, Charlestown.  
Reade, Vincent de P., 187 Main street, Charlestown.  
Reade, Vincent de P., Jr., 187 Main street, Charlestown.  
Regan, Martin, 1032 Tremont street, Roxbury.  
Ring, Timothy F., 205 D street, South Boston.  
Roach, Edward E., 191 Pynchon street, Roxbury.  
Roeder, John R., Henshaw street, Brighton.  
Roles, Roswell, 730 Shawmut avenue, Roxbury.  
Ryan, Stephen D., 1093 Tremont street, Roxbury.  
Silverstein, Myer L., 238 Hanover street, Boston.  
Smith, Benjamin F., 251 Tremont street, Boston.  
Smith, Samuel G., 106 Dorchester street, South Boston.  
Spencer, W. F., 204 Broadway, South Boston.  
Sprague, John W., 120 Meridian street, East Boston.  
Stanetsky, Jacob, 13 Wiget street, Boston.  
Stokes, Waldo J., Park street, West Roxbury.  
Sullivan, J. F., 358 Market street, Brighton.  
Sullivan, Samuel J., 545 Harrison avenue, Boston.  
Sullivan, T. J., 332 Broadway, South Boston.  
Tinkham, Charles F., 20 Howard street, Boston.  
Tinkham, Jeremiah, 20 Howard street, Boston.  
Tondorf, Joseph B., 129 Shawmut avenue, Boston.  
Vinal, Frederick, Deer Island.  
Waterman, Frank S., 2326 Washington street, Roxbury.  
Waterman, George H., 2326 Washington street, Roxbury.  
Watson, Bernard L., 52 Warren street, Roxbury.

Willard, George A., 110 Dorchester street, South Boston.  
Williams, N. M., 1386 Washington street, Boston.  
Williamson, Joseph, 29 Vernon street, Roxbury.  
Wittenberg, Solomon, 66 Salem street, Boston.

#### PUBLIC BATHS.

In April, 1898, the care of the public baths and the public urinals, which for many years were in charge of this Board, was transferred to a commission appointed by the Mayor for that purpose.

#### APPOINTMENTS.

The Board organized on the first Monday in May by the choice of Dr. Samuel H. Durgin as Chairman and Charles E. Davis, jr., as Secretary.

On the twenty-first of March, Dr. Hibbert W. Hill was appointed Bacteriologist and Director of the Laboratory.

The resignation of John A. Duddy, who had been continuously employed in this department as an Inspector of Nuisances during the last twenty-five years, was received and accepted July 25.

Dr. Henry B. Stearns was appointed a Medical Inspector of Schools August 31, in place of Dr. H. A. Stiles.

December 14, Joseph M. Harrington and John B. McDonough were appointed Inspectors of Nuisances.

SAMUEL H. DURGIN, M.D., *Chairman.*  
GEORGE F. BABBITT.  
EDWIN L. PILSBURY.

## FINANCIAL STATEMENT.

## EXPENSES FOR TWELVE MONTHS, ENDING JANUARY 31, 1899.

Board of Health (salaries)	\$12,500 00
Clerk-hire	10,710 24
Messenger	652 71
Inspectors of nuisances	27,008 95
Veterinary inspector at abattoir	3,861 07
Medical inspectors	5,150 00
Superintendent of pedlars	2,054 17
Maintenance of hospital	1,013 39
Disinfection	14,405 23
Abatement of nuisances	1,147 98
Epidemic hospital	1,920 55
Care of public urinals	931 93
Care of burial-grounds	55 00
Postage	345 85
Telephone	573 76
Travelling expenses of officers	1,497 07
Office expenses	1,203 90
Vaccination	600 16
Horses and vehicles	1,393 00
Stationery	551 22
Printing	4,114 97
Advertising	13 00
Medical examination of police and firemen	479 50
Examination of plumbers and gas-fitters	827 05
Manufacture of antitoxin	817 87
Bacteriological work	6,595 20
Medical inspection of schools	9,056 00
Morgue	370 23
Gas inspection	103 19
	<hr/>
	\$109,953 19
Public baths	2,390 88
Quarantine:	
Port physician and assistant	2,200 00
Gallop's Island	4,925 01
Steamer "Vigilant"	21,528 10
Other expenses	334 96
Inspection of provisions	2,871 75
Inspection of milk and vinegar	10,687 06
	<hr/>
Total	<u>\$154,890 45</u>

## RECAPITULATION.

Appropriation	.	.	.	.	.	.	.	\$155,000 00
Expended	.	.	.	.	.	.	.	154,890 45
Balance unexpended	.	.	.	.	.	.	.	<u>\$109 55</u>

## INCOME.

Quarantine	.	.	.	.	.	.	.	\$6,806 00
Inspector of Milk and Vinegar	.	.	.	.	.	.	.	808 00
Abating nuisance	.	.	.	.	.	.	.	200 00
Small-pox hospital, rents	.	.	.	.	.	.	.	450 00
Sale of horses	.	.	.	.	.	.	.	194 00
Total	.	.	.	.	.	.	.	<u>\$7,958 00</u>

## REPORT OF DIRECTOR OF BACTERIOLOGICAL LABORATORY.

*To the Board of Health :*

GENTLEMEN,—I have the honor to submit the following report for the nine months since the opening of the laboratory, ending January 31, 1899.

In March, 1898, the Bacteriological Laboratory was established in the Sudbury Building. The necessary fitting up and equipment was begun at once. On the tenth of May, the work done during three years past for the Board of Health at the Harvard Medical School was transferred to this laboratory, with the exception of the making of diphtheria antitoxin, the State Board of Health having agreed to continue the supply.

The work consisted at that time principally of the diphtheria diagnosis, but has been gradually extended so that at the present time regularly organized services exist for the diagnosis of typhoid fever, malaria and glanders also. Rabies cases are investigated, but this disease is not sufficiently prevalent to justify a detailed organization. Examinations for other pathogenic bacteria, such as pus-organisms, gonococci, the bacillus of influenza, etc., are made as may be required. The testing of disinfectants for municipal work is also part of the recognized work of the laboratory.

## LABORATORY.

In this report, the first since the establishment of the laboratory, a brief description of the laboratory with its arrangements, fittings and methods is given somewhat in detail, as well as an account of the routine work accomplished.

The original floor-space acquired contained 1,600 square feet. To this has been added about one-sixth more for an animal room, which was not at first provided, since the original intention contemplated the keeping up of the supply of animals for the laboratory from the breeding pens at Gallop's Island. It was found, however, that this arrangement did not permit that minute attention to breeding and to classification which is advisable for experimental animals.

The laboratory consists of five rooms. Three of these are devoted to the bacteriological work proper—the media

room, the animal room and the microscope room. Two are used for executive work — the reception and care of culture boxes, malaria, typhoid and glanders outfits, the keeping of records, writing of reports and other details of administration.

The media room contains the sterilizers, coagulators, chemical apparatus and cooking utensils necessary to the making up of media, and a refrigerator for storing the same. The cleaning of glass ware, etc., — no inconsiderable item — is also done here. A large closed hood carries the various gases and vapors formed during the cooking operations into a ventilating flue, ensuring their thorough removal.

The microscope room contains, in addition to the benches arranged for the microscopes, an incubator closet, a refrigerator for stock cultures, and a balance.

In the animal room are the pens and cages for the inoculated animals and for breeding purposes.

## METHODS.

### *Diphtheria Diagnosis.*

*Outfits.* — The outfit consists of a copper box (dimensions six inches long, two and one-fourth inches wide and one inch deep) having two pairs of U springs in the bottom so placed that two small strong test tubes (five inches long, one-half inch internal diameter) made without lips can be held securely by them. One of the test tubes contains Loeffler's blood serum, the other contains a swab. Both tubes are closed by cotton stoppers, that of the serum tube containing a small cork concealed in the cotton, serving to prevent the too rapid drying out of the serum (Theobald Smith). The swab is of brass wire, one inch of one end being roughened and wound with non-absorbent cotton of a fine grade (jewelers' cotton). Non-absorbent cotton is used because the object sought is the transfer of the material from the suspected throat to the serum, not its absorption by the cotton. The box and both tubes are sterilized before being sent out. In each box is placed a card to be filled out by the physician when he takes the culture, and two circulars — one giving the directions for taking the culture, the other defining the official relations of the Board of Health to diphtheria cases especially with regard to release.

*Culture Stations.* — The outfits are distributed to certain regularly appointed drug stores, known for this purpose as "culture stations." There they are kept for two months, or until called for by a physician who wishes to take a culture. After the culture is taken the physician returns



the outfit to the culture station, from which it is forwarded to the laboratory. The culture should reach the station not later than will allow ample time for its arriving at the laboratory by 6 P.M.

*Incubation.*—On receipt of the culture outfit at the laboratory the number of the box and the patient's name is immediately recorded, the box is credited to the station from which it comes, and the card is stamped with the date of receipt. At 6 P.M. all the boxes received during the day are placed in the incubator at 37° C. for examination next morning at 8.30.

*Reports.*—The diagnosis, + or —, is marked on the card at the time of the morning examination. As soon as the cards are marked they are compared with the card catalogue consisting of cards previously received. They are thus classified—the positives as primary or secondary cards; the negatives as primary, or if for release, as first or second negatives. The report to the department is then made out, and individual reports sent by mail to the physicians. Many cases are reported by telephone, the physician calling up the laboratory, or the laboratory calling up the physician in response to a request from him written on the card. The number of calls relating to this work alone is about 1,800 for this year. In every case a report is sent by mail. When a first negative culture for release is obtained the medical agent of the district in which the case exists is notified by mail to take a culture. If this proves negative it constitutes the required second negative, and disinfection is proceeded with on receipt of such report from the laboratory of the Board of Health. Finally, the new cards are catalogued with the old ones.

*Special Examinations.*—When requested, the laboratory is ready at all times during hours (9 A.M. to 5 P.M., Saturdays, 9 A.M. to 1 P.M., Sundays, 9 A.M. to 11 A.M.) to examine the *swabs* from cases for diagnosis directly. It has been found that in from one-third to one-half of the cases finally proving positive after the ordinary incubation, a positive diagnosis can be made from the swab without waiting for incubation, thus saving from sixteen to twenty-four hours. Should a negative result be obtained from the swab, however, no reliance can be placed on the examination. In such cases, if the culture has been brought into the laboratory before 12 M., a *six-hour incubation* may be given, the examination being made and reported on at 5 P.M. Should a negative result be obtained, it must be considered unreliable, and the result of the regular over-night incubation must be



obtained before a conclusion is arrived at. A positive report from either swab or six-hour incubation may, however, be considered final.

### *Typhoid Fever.*

The dried blood method for the Widal reaction is used. The outfit consists of aluminum foil (after Westbrook) on which the blood is to be dried, let into three-layer cards, carrying also a small copper wire loop (after Johnson) for transferring the blood to the foil. The card gives directions for handling the foil and wire. With this card is sent another card to be filled out by the physician, and a circular of directions. All three fit into a manila envelope for safe keeping, and the whole is mailable for two cents postage. The outfits are sent by mail on receipt of requests therefor at the laboratory. After the physician has taken the blood preparation it is returned to the laboratory by mail. The examination is made thus: The dried blood on the foil is mixed with ten times as much sterile water; a drop of this dilution is mixed on a coverslip with a drop of broth containing typhoid bacilli, making a total dilution of one in twenty. This preparation, mounted as a "hanging drop," is observed at intervals under the microscope for from thirty minutes to one hour. If only loss of motility or only clumping is observed, the preparation is called atypical and another requested. If both occur, a positive, and if neither, a negative report is sent. A new typhoid culture on agar, reaction + 1.5 (1.5 per cent. acid) is made every day from a previous agar culture one month old. This ensures that there shall always be an agar culture one month old in the laboratory. From this month-old agar is made also every day a broth culture (+ 1.5 initial reaction)<sup>1</sup> which is ready for use next day after incubation for twenty-four hours at 37°C. Reports are sent by mail. The physician may get his report by telephone also if he so desires. Reports are transmitted to the Board of Health, and the physicians' cards are catalogued as in the diphtheria service.

### *Malaria.*

The outfit consists of a small flat tin box which contains half-a-dozen clean coverslips wrapped in paper (after the Massachusetts State Board of Health). On application to the laboratory, one such box, accompanied by a circular of

<sup>1</sup> The reaction is adjusted by the titration methods recommended by Fuller, and adopted by the Bacteriological Committee of the American Public Health Association. The reaction designated (+ 1.5) ensures a perfectly uniform growth, without clumps or surface membrane; the bacilli show good active motility.

directions and a card to be filled out with the particulars of the case by the physician, is mailed to the address given. Upon receipt of the coverslips with the blood smeared on them as directed, the examination is carried out. Romanowsky's method has been followed. Reports are mailed as in other cases, but telephone reports are given also if requested. The cards are catalogued as in the diphtheria service.

### *Glanders.*

This service was organized at the suggestion of Dr. Alexander Burr, veterinarian to the Boston Board of Health.

The outfit consists of a cylindrical copper box containing an eight-inch test tube, a card for particulars of the case and a circular of directions. (See Appendix, Forms 7 and 34.) The test tube contains a large swab of a design similar to that used for the diphtheria work. The cotton used is absorbent, however, instead of the non-absorbent used for the diphtheria swab, because in glanders the object sought is the accumulation in the cotton of as much as possible of the suspected material. The outfits are sterilized each time before being sent out, and are kept at the same culture stations with the diphtheria outfits. On receipt of an outfit from the veterinarian, the swab is transferred to 5 c.c.'s of sterilized water and shaken thoroughly in it. The resulting suspension is inoculated intra-abdominally into well-grown male guinea-pigs, and a positive or negative diagnosis is based upon the development of scrotal inflammation in from two to seven days, after further examination of the tissues in every case for the isolation of the organism. Reports are sent by mail, and also by telephone, as in the other services.

The other diseases in which these methods of examination are of diagnostic value are not submitted for diagnosis sufficiently frequently to make a regular organization for each necessary. These are rabies, gonorrhea, influenza, and very occasionally dysentery, cholera, syphilis, leprosy, etc. The laboratory is, nevertheless, at the service of the profession in these or other cases, such as septicæmias, abscesses, etc. The methods of examination for the first three of these diseases are given below. The other four are of little importance at the present time in public health work in this part of the world.

### *Rabies.*

Rabies is examined for by injecting under the dura of a full-grown rabbit (exposed by trephining) half a c.c. of an

emulsion consisting of about one gram of brain tissue from the suspected animal in 10 c.c.'s of sterile water, filtered through absorbent cotton and paper. The trephine hole is just posterior to a line joining the centres of the eyes. Paralysis or convulsions developing after fourteen days, followed by death, is good evidence of the presence of rabies, if other lesions can be excluded by a careful autopsy of the rabbit, with cultures from blood and organs. Two rabbits at least should be inoculated with the same material in each case.

### *Gonorrhea.*

Gonorrhea is examined for by two methods. The first is the direct staining of the discharge itself, sent in spread as a thin film on coverslips or slides, by the method of Gram, followed by Bismarck Brown in aqueous solution. The more or less biscuit-shaped gonococci are then seen as brown diplococci, often lying in cells; other cocci which sometimes resemble the gonococcus in shape arrangement and situation, retain the Gentian-violet stain of Gram's method, thus showing purple in contrast to the gonococci which lose the purple stain under the Gram treatment and become brown on adding the Bismarck Brown. The second method resembles that used for the diphtheria diagnosis, in that cultures are made on Wasserman's nutrose-serum-agar, described beyond, and the organism thus isolated for subsequent examination. The first method is applicable to acute cases where the infection is likely to be almost pure or the gonococci present in decided excess of the other organisms. The second method allows of plating if necessary, and is applicable to later stages, where the gonococcus may be obscured by the presence of considerable numbers of other organisms.

### *Influenza.*

Influenza is examined for by direct staining of nasal or bronchial discharges, and by cultures from these regions and from the blood on glycerine agar.

### *Disinfectants.*

The testing of disinfectants used in municipal work, begun at the time when the bacteriological work of the Board was carried on at the Harvard Medical School, has been continued here. The points to be considered in the investigation of disinfectants are:

First. Bactericidal action.

Second. Physical and chemical action, including keeping powers and other characteristics.

Third. Physiological action, including effect on man and lower animals.

Fourth. Convenience in handling, storage, etc.

Fifth. Range of application.

Sixth. Cost.

Any disinfectant which is particularly undesirable on account of peculiarities falling under any one of the above heads may be rejected without minute consideration of its other qualities. Thus if bactericidal power be low or instability great, or if the disinfectant be extremely poisonous in minute quantities, or very troublesome in application, or if it have a very limited applicability or prohibitive cost, this single disability presented by it would rule it out of consideration at once. When, however, a number of disinfectants are available, none of which are extreme in their faults and all of which are fairly close to each other in their good points, it becomes a matter involving much careful consideration and many experiments to determine that which is to be selected on the ground of "best results at the most economical figures."

Bactericidal power requires careful laboratory experiments to determine the elemental facts—and here many factors must be considered; various strengths of the disinfectant must be tried for various lengths of time on bacteria of various resistant powers, holding various physical relations to various conditions of temperature and moisture, in various mixtures with albumens, fats, feces, urine salts, etc.

The determination of keeping powers under various circumstances necessitates usually chemical examinations, as well as bacteriological, in order to discover changes in composition if any occur, the rate at which they occur under various conditions, and their effect in diminishing or otherwise altering the efficiency of the disinfectant. The poisonous, disagreeable or other effect on man must be considered and also the effect on lower animals so far as these are likely to come in contact with the disinfectant.

Convenience in storing and handling, depending on physical and chemical constitution, are essential points where disinfection is done on a large scale, scattered over a wide area as in municipal work.

Range of applicability is a most important point. This range depends upon the physical, chemical and physiological action of the disinfectant, its degree of concentration, its keeping powers, its effect on materials of every-day use,

varnish, wood, paint, fabrics, metals, dyes ; its action on soaps, fats, albumens, etc.; its miscibility with other substances. The range of applicability indeed depends upon all the other features except that of cost, which in itself is a matter to be considered in relation to all the other factors. Indeed all are inter-related to an extent which makes the full investigation of the whole subject a very extensive one.

The principal methods of testing action on bacteria are as follows :

Bactericidal action (disinfectant action). This is tested by direct exposure of well-grown bacteria to the action of the disinfectant; three variables at least must be considered and worked out — the bacteria themselves, the strength of the disinfectant and the time of exposure.

Owing to the fact that different cultures, even of the same species of bacteria, vary in resistance, not only in accordance with age, presence or absence of spores and other readily understood conditions, but also on account of some inherent differences in vitality, dependent on numerous factors, really close work can only be accomplished by the use of cultures previously standardized by testing them with known strengths of known disinfectants. These check experiments should be made parallel with the new tests.

The strength of the active agent in the disinfectant requires careful determination. Disinfectants which do not permit of such determination should be approached with considerable caution. Such determinations should be made and recorded for every test; the omission of this important item has rendered useless for comparative consideration much otherwise careful and extended work. Determinations of efficiency based on one strength do not necessarily apply to other and especially to weaker strengths, so that unless the active agent is known and determinable chemically, it will be difficult to ensure uniformity of results in practice with the use of successive lots of the same disinfectant.

The time of exposure is a matter requiring care. Not only must the experiments be so carried on as to ensure a full and equable exposure during the whole period selected for investigation, but also care must be taken to ensure that the action of the disinfectant really ceases at the end of that period. It is practically important to determine the minimum time for different strengths.

Other factors bearing on this point also are the conditions of the temperature, pressure and humidity under which the experiments are carried out. For practical purposes, however, "ordinary conditions" of this nature, such as will be met with in actual work, are usually all that need be considered.

Disinfectants may also be tested for their inhibitive action (or antiseptic power). This action is distinguished from bactericidal power in that the latter acts on the bacteria by depriving them of life through direct interference with their vital activities, whereas, it is conceivable that a substance incapable of acting thus directly on living bacteria may nevertheless affect the decomposable matter which it may be desired to render resistant to bacteria in such a manner as to prevent or delay their development. Such a substance would be an antiseptic in the usual meaning of the term.

Antiseptic or inhibitive action may be tested by adding the active agent to sterile materials fit for bacterial foods, subsequently adding various forms of bacteria in small amounts and thereafter testing their multiplication in the mixture. It is true that most of the substances which are disinfectant in certain strengths are also antiseptic in much weaker strengths. This is perhaps rather because of the direct action on the smaller number of bacilli, preventing their active multiplication, stunning them so to speak by subjecting them to a lesser degree of the same influence which in strength sufficient to "disinfect" would kill them, than an action upon their surrounding food materials as described above. For municipal purposes, it is of course the active disinfectant action capable of destroying fully developed and numerous organisms which is required rather than the feebler antiseptic action which prevents or delays development or affects in other ways the character of the growth.

The methods of exposure of organisms to disinfectant or antiseptic action vary in technical details with the object desired, and to some extent with the particular investigator, since great uniformity of technique in this as in other lines of bacteriological work is not yet generally established. The simplest method involves the exposure of the organisms on the surfaces of substances hard, non-absorbent and chemically inactive, of which perhaps glass is the best. Certain metals affect bacteria directly as shown by Bolton, Robinson and others, and are therefore not always advisable for this purpose. Rubber has been used by Johnson. An older method for testing liquid disinfectants consists in mixing them directly with broth cultures in various proportions. Owing to reactions which may occur between the broth itself and the disinfectant, even in the absence of bacteria, suspensions of the bacteria taken from the solid media and distributed evenly in sterile water are usually to be preferred to broth cultures. Broth has been used partly

because it reproduces to some extent the conditions usually present in practical disinfection. But to the writer, this view does not seem altogether sound. If it is desired to test absolute bactericidal power under fixed conditions with practically no interference from side reactions, then the organism alone on glass or in water is in the conditions best suited to test the action of the disinfectant on dry and moist bacteria respectively. If it is desired to test the disinfectant action under practical conditions, then tests should be made using sewage, feces, urine, or other such materials as the vehicle for the organisms. The use of broth is a half-way measure allowing certain side reactions, while failing to reproduce practical conditions in full. The direct exposure of cultures *in situ* on solid media is open to somewhat similar although less obviously objectionable side reactions. The writer is aware that much excellent work has been done in the hands of many investigators using many different methods, some of which are included in those here criticised. This fact, however, need not prevent the weaknesses of the methods from due consideration.

The action of disinfectants on the products of bacterial life as distinguished from the bacteria themselves is a subject of growing importance in certain lines of work, although hitherto its value in municipal work has not received wide and practical recognition. The American Public Health Association has for many years paid much attention and done much excellent work in developing and standardizing the methods of examination above outlined. The publications of that association contain much literature on the subject.

#### NEW WORK.

Owing to the necessity of developing a careful and exact routine, which should ensure the smooth working of all the various diagnostic services under all conditions, comparatively little attention has yet been devoted to research work. Nevertheless, certain forms of apparatus, methods and matters of general bacteriological interest have been originated as follows:

##### *Apparatus for testing disinfectants.*

This consists simply of a glass rod passing through the cotton plug of an ordinary test tube. After sterilization of tube and rod, the test organisms are smeared from a solid culture upon the enclosed end of the rod, and the free end is labelled with the name and date of the culture. The exposure is made by withdrawing the rod and leaving it in contact with

the disinfectant gas or liquid as long as may be desired. Thereafter, the rod may be washed in sterile water to remove any adherent disinfectant and then plunged into liquid media or rubbed on the surface of solid media to test growth. (Journal Am. Pub. Health Ass'n, September, 1898, vol. xxiv.)

*A modification of the fermentation tube.*

The modification consists in substituting a thimble-shaped ground glass stopper for the upper closed end of the closed branch. Should the thimble be lost or broken a sterile rubber cork forms a fair substitute. This change permits ready access to the liquid in the closed branch without disturbing its relations to the liquid in the bulb. It was designed to allow not only the examination of the chemical changes in the liquids resulting from aerobic and anaerobic growths respectively, but also to permit an investigation of the differences in virulence and toxicity resulting from the growth of the facultative organisms under the two conditions. (Journal of Boston Soc. Med. Sciences, January 24, 1899.)

*A filler nozzle for use in filling media tubes.*

This consists of a small glass tube fused into a larger one, so that both have a common axis, the free end of the smaller tube terminating one-eighth of an inch within the opening of the larger tube. The medium descending to the test tube through the small inner tube is effectually prevented from striking the side of the test tube by the larger outer tube. (Not heretofore described; made for the writer by the Knott Apparatus Company, of Boston.)

*For obtaining white Loeffler's serum.*

See "Media."

GENERAL BACTERIOLOGY.

*Two consecutive negative cultures for release in diphtheria.*

This question has been investigated carefully. Although it has long been known that release on one negative is not by any means a perfect method, and although it has been known also that release can only be granted safely after obtaining two or more consecutive negatives, it was thought well to attempt to place this matter on a definite basis. It has been shown here that nearly 30 per cent. of positive cases officially released on two consecutive negatives presented at least one negative followed by a positive culture,



and therefore would have retained the bacilli after official release, had they been released at the time of obtaining the first negative.<sup>1</sup>

*Branching forms of diphtheria bacilli.*

Several pure cultures showing a large number of branching forms were isolated from the throats of diphtheria patients between August, 1898, and the end of the year. After a detailed examination of the cultures and a search of the literature relating to this subject the conclusion was reached that the bacillus of diphtheria showed evidences of relation to the streptothricheae. A preliminary note on this work has been published elsewhere.<sup>2</sup> The practical help in diagnosis afforded by these observations was pointed out also in another paper.<sup>3</sup>

*Media.*

The uniformity of results necessary to success in bacteriological work ultimately depends largely on the composition of the media and the methods used in making them. The results obtained in two different laboratories can never have a rational basis of comparison until methods similar in all essential respects are followed in both.

In 1895, the Committee on Pollution of Water Supplies of the American Public Health Association appointed a committee of bacteriologists to draw up a series of recommendations on this subject. The work of the committee resulted in the publication in 1898 (Journal American Public Health Association, January, 1898) of a set of recommendations relating to the methods of making media and of using the same, which up to the present time seemed to be of the widest and most definite value.

In organizing this laboratory the methods recommended by the Bacteriological Committee were adopted as standards. The writer, having been associated with one of the members of the committee, had in the past been familiar with these methods, and it was necessary merely to embody them in the routine work. A recapitulation of these methods may seem unnecessary, but the writer is so strongly impressed with the value of the tendency towards uniformity which it was the chief object of the committee to encourage, that he feels it advisable to record these methods as followed here in actual practice. In those matters on which the committee did not give specific directions, the devices employed in this laboratory have been found thoroughly satisfactory.

<sup>1</sup> Journal Massachusetts Associated Boards of Health, July, 1898; *ibid.*, July, 1899.

<sup>2</sup> Journal Boston Society Medical Sciences, January 17, 1899.

<sup>3</sup> Journal Massachusetts Associated Boards of Health, January 26, 1899.

*Loeffler's Blood Serum.*

Broth containing 1 per cent. dextrose is made (see "Broth," below) and adjusted to +0.8 (or 0.8 per cent. acid). The serum is obtained from beeves slaughtered at the Brighton abattoir. Glass jars are provided at the abattoir for the reception and coagulation of the blood. The serum is drawn off after twenty-four hours and delivered to a messenger from the laboratory.

The serum is often dark in color from the presence of a large amount of defibrinated blood. In order to avoid the chocolate-colored medium which results from the coagulation and baking of such serum, the simple plan of filtering the serum after adjustment of the reaction to +0.8 (0.8 per cent. acid) through the coagulum which remains on the cotton filter after the filtration of broth is adopted. Passing the serum through this coagulum ensures a nearly white solid medium after coagulation.<sup>1</sup> One part of the broth is mixed with three parts of the filtered serum. Tubes are filled from the mixture and placed in trays sloped at such an angle that it gives to the liquid mixture a uniform slant in each tube. The trays are placed in a Koch coagulator<sup>2</sup> containing cold water in the water jacket. This water is brought to a boil and kept boiling for three hours. Repeating this process on three successive days solidifies the serum so that it may be subsequently sterilized in flowing steam (Arnold sterilizer) twenty minutes each day for three days. The resulting serum is firm, white and sterile. It is kept in the ice-chest until used.

*Broth.*

Lean round of beef, with the fat and connective tissue removed as far as possible, is macerated in an agate-ware dish in the refrigerator for about twenty hours with twice its weight of water. Water is then added to make up the loss of weight by evaporation, and the infusion is filtered through clean cloth to remove the meat. The infusion is titrated and its acidity recorded. The amount which is to be used is weighed in an agate-ware dish and placed upon the water bath. To this is added, peptone 1 per cent. and salt  $\frac{1}{2}$  per cent. For Loeffler's serum, 1 per cent. dextrose is also added. These ingredients are allowed to dissolve, the temperature being kept below 60°C. to prevent coagulation of the albumen. As soon as solution has occurred, the mixture

<sup>1</sup> This simple process was devised by John V. Mulcahy, the laboratory man.

<sup>2</sup> A small strong incubator can be substituted with perfect success for the Koch coagulator. The initial cost of the latter is, however, much less.

is titrated and adjusted to the neutral (phenolphthalein) point. Meantime, the water bath has been brought to a boil. The agate-ware dish is returned to the boiling water bath and kept there thirty minutes. The media and dish are then weighed, and water is added to replace the loss by evaporation thus detected. The reaction is now adjusted to whatever point may be desired by Fuller's method of titration and addition of acid or alkali. For Loeffler's serum, +0.8 (0.8 per cent. acid) is used. For other work, +1.5 (1.5 per cent. acid) is the most generally advisable. The media is now kept boiling hard for five minutes over a free flame; the loss of weight by evaporation is made up and the medium filtered through absorbent cotton supported in an agate-ware funnel. By passing the broth through this filter two or three times, a perfectly clear liquid results. The reaction is then tested and will not usually be found changed. The broth is then distributed into tubes and sterilized for fifteen minutes in flowing steam (Arnold's sterilizer) on three successive days. The tubes are not placed in the sterilizer until the latter is full of steam.

This method is based on that suggested by Fuller in 1895 at the bacteriological convention of the American Public Health Association. The writer, working with Mr. Fuller in 1896, found valuable the addition of five minutes' boiling described above after the use of the water bath. This addition was incorporated in the recommendations of the Bacteriological Committee in 1898. Subsequent experience has led the writer to adjust the reaction to its final point, as described above, *before* this boiling instead of afterwards. Some albumens, soluble at the neutral point, are rendered insoluble after the acidity is increased to +1.5 (+1.5 per cent. acid). Thus it happens in the older method that a medium, after being filtered perfectly clear at the neutral point, may precipitate, as a result of the subsequent addition of acid, during the process of sterilization. If the writer's method is followed, the precipitation during sterilization is uniformly avoided. Not only is much disappointment and trouble thus saved, but greater uniformity in the composition of successive lots of media is ensured; for if, after media is prepared in the ordinary way, subsequent clarification with egg as often recommended is required, involving more boiling and filtering, the process becomes more complicated, and variations from the exact and uniform technique, essential to ultimate uniformity of results, necessarily occur. The writer holds strongly the view that a medium in which deviations from a rigid standard of preparation have occurred, however

apparently harmless the deviations may seem to be, should be discarded, and a new lot should be made up, rather than that the old lot should be worked over until a satisfactory *appearance* merely is obtained. Since almost nothing is known definitely of the different series of chemical changes resulting from different methods of handling media, the only logical proceeding is to ensure, so far as possible, by a rigid technique, *the obtaining of the same series of changes in all cases*, whatever these changes may be. The evidence derived from careful work on bacterial counts shows that comparatively small variations in composition, in length of time employed in sterilization, and in almost every other detail of media-making, affect, to some degree, the efficiency of the medium. For these reasons the writer has condemned (see "Report on Sanitary Condition of the Brooklyn, N.Y., Water Supply") the practice of keeping media in bulk with the purpose of withdrawing and tubing portions thereof at intervals as may be required. He has found, in common with others, that such a proceeding, involving as it does an amount of sterilization not given to those lots of media which are tubed and sterilized immediately after they are made up, affects the efficiency of the later lots withdrawn for use. The writer practices the immediate tubing of the whole of any medium made at any one time, keeping none in bulk. Until future additions are made to the knowledge of the efficiencies of media, this proceeding would seem to be the most logical.

#### *Nutrient gelatin.*

This is made in exactly similar a manner to broth, the only difference being the addition of sheet gelatin (10 per cent.) to the meat infusion with the peptone and salt. The original recommendation in 1895 (see "Journal American Public Health Association") involving the boiling of the infusion to ensure the solution of the gelatin, was found by the writer to be unnecessary since solution occurs readily below 60° C. A distinct objection to this initial boiling consists in that, occurring as it does at a reaction of +4.0 or thereabouts, it tends to alter the analogy of the gelatin to broth which, if made as recommended by the Bacteriological Committee, is not boiled at this reaction. The initial boiling is also very apt to result in burning the gelatin, whereas the boiling following on the water bath treatment does not so result. These changes also have been incorporated in the recommendations of the Bacteriological Committee.

*Nutrient agar.*

In the preparation of this medium, the writer has, until recently, followed the procedures recommended by the Bacteriological Committee. He has sought, however, since 1895, to find some method which would make the preparation of agar strictly analogous to that of broth and gelatin and has now perfected a very simple method which, although it departs somewhat from the letter of the Bacteriological Committee's recommendations, yet, in the writer's opinion, fulfils the spirit more closely than the recommendations themselves. This method involves two slight changes only from the procedures followed in the case of broth and gelatin. The first consists in infusing the meat to be used with an equal weight of water instead of twice its weight. The other consists in boiling the thread agar for half an hour in water and allowing it to solidify, the percentage of agar being double that which it is intended that the finished media shall show.<sup>1</sup> At that stage in the preparation of ordinary broth where peptone and salt are added, the double strength infusion is neutralized and the double strength agar-jelly is added also in the proportion of equal parts of jelly and infusion. In every other respect, the method for agar is identical with that for broth. The filtration is performed in the same manner and all difficulties in this process attendant on filtration through paper are avoided. By this method, the making of agar becomes almost as simple a process as the making of broth, and the three principal artificial media are placed upon a strictly analogous basis.

The question naturally arises as to whether or not the broth obtained by extracting a certain quantity of meat with twice its weight of water, and that obtained by extracting the same quantity of meat with an equal weight of water, contain the same absolute amount of matter. On this point hinges the reliability of this method and its analogy with the methods for other media.

In order to determine this point, a certain quantity of finely chopped meat was mixed mechanically and divided into two portions. One thousand grams of meat were mixed with one thousand grams of water. Another thousand grams of meat were mixed with two thousand grams of water. After infusion

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<sup>1</sup> This method was devised by M. P. Ravenel and by the writer (independently of each other). Ravenel's method includes the use of an autoclave, which the writer finds unnecessary. Other minor differences also exist. (See *Journal Applied Microscopy*, June, 1898; *ibid.*, March, 1899.)

both for twenty hours, the color, opacity, reaction, and total solids of each were compared. The results were as follows:

One thousand grams of meat with one thousand grams of water:

Reaction to phenolphthalein, 4.2 per cent. acid.

Color — when diluted with an equal quantity of water, the color and opacity could not be distinguished from that of the second lot.

Total solids (estimated by Dr. Charles Harrington), 2.59 per cent.

One thousand grams of meat with two thousand grams of water:

Color — one-half that for first lot.

Reaction, + 2.2 (2.2 per cent. acid).

Total solids (estimated by Dr. Charles Harrington), 1.33 per cent.

Thus with Lot No. 1, diluted one-half in the new process, it would compare with No. 2 thus, the color being identical:

No. 1. Reaction, + 2.1.

Total solids, 1.295 per cent.

No. 2. Reaction, + 2.2.

Total solids, 1.33 per cent.

The difference in reaction estimated amounts to .1 per cent. acidity, but cannot be considered of much moment on account of the difficulty of working very close on this scale. The difference in total solids is also very small, .035 per cent. It would appear then that the two methods yield sufficiently similar results for reliable use. The following table published in the Journal of Applied Microscopy, March, 1899, places these methods in a convenient form:

**Table showing analogy between Broth, Nutrient Gelatin, and Nutrient Agar made by methods herein recommended.**

		Boil thirty grams thread Agar in one litre of water for half an hour. Make up to a weight of 1,000 grams. <i>Cool and solidify.</i>
NUTRIENT BROTH.	NUTRIENT GELATIN.	NUTRIENT AGAR.
1. Infuse lean meat 20 hours with twice its weight of distilled water in refrigerator. Say 1,000 grams meat. " 2,000 grams water.	Ditto.	Infuse lean meat 20 hours with its own weight of distilled water in refrigerator. Say 1,000 grams meat. " 1,000 grams water.
2. Make up weight of meat infusion (and meat) to original weight by adding water, <i>i.e.</i> , to 3,000 grams.	Ditto.	Ditto. <i>i.e.</i> , to 2,000 grams.
3. Filter infusion through cloth to remove meat.	Ditto.	Ditto.
4. Titrate and record reaction of filtrate. Say reaction + 2.2%.	Ditto.	Ditto. Say reaction + 4.2%.
5. Weigh infusion. Say 1,800 grams.	Ditto.	Ditto. Say 900 grams.
6. Set infusion on water bath, keeping temperature below 60° C.	Ditto.	Ditto.
7. Add peptone, 1%, 18 grams, salt, .5%, 9 grams.	Ditto and sheet gelatin 10%, 180 grams.	Add peptone, 2%, 18 grams, salt, 1%, 9 grams.
8. After ingredients are dissolved, titrate, reaction probably + 2.3 to + 2.5.	Ditto. Prob. + 4.0 to + 5.0.	Ditto. Prob. + 4.5 to + 4.7.
9. Neutralize, Fuller's method.	Ditto.	Ditto. To the 900 grams of meat infusion (containing now peptone and salt) add 900 grams of the 3% Agar jelly described at the head of this column.

10. Heat over boiling water (or steam) bath thirty minutes.

11. Restore weight lost by evaporation to original weight of filtered meat infusion, *i.e.*, that on which the percentage of peptone and salt, etc., were calculated, — 1,800 grams in *each case*.

12. Titrate, reaction probably + 0.3 to + 0.5.

13. Adjust reaction to final point desired, + 1.5 per cent.

14. Boil five minutes over free flame, with stirring

15. Add water, if necessary, to make up loss by evaporation, to 1,800 grams.

16. Filter through absorbent cotton, passing the filtrate through the filter repeatedly until clear.

17. Titrate to determine whether or not the desired reaction has been maintained.

18. Tube and sterilize.

For methods of titration see Journal Am. Pub. Health Ass'n, October, 1895, and January, 1898. Also, Massachusetts State Board of Health, 1895; Fuller and Copeland.

#### *Dextrose, Lactose, Maltose, and Saccharose Broth.*

These sugar broths are made thus: After filtration of the meat infusion, prepared as above described, the infusion is placed in an Erlenmeyer flask, inoculated with a fluid culture of the colon bacillus, or of an allied gas former, to remove the meat sugar (Smith's method), and incubated twenty-four hours at 37° C. From this infusion broth is made in the ordinary way. Fermentation tubes are then filled with 25 c.c.s. each of the sugar-free broth and sterilized. When a sugar test is to be made, 1 c.c. of a sterilized 25 per cent. solution of the required sugar is added, immediately after having been boiled to expel any air it may contain, and allowed to mix with the broth, also recently heated. It is important that no air should be admitted to the closed branch during this process. The removal of the original meat sugar is more important when it is desired to obtain experimental results with lactose, maltose, saccharose, etc., than when dextrose is the sugar the effect of which is to be tested. Sugar-free broth thus prepared is also advisable for the production of diphtheria toxin,<sup>1</sup> and as a medium for use in testing the production of indol. (Peckham.)

#### *Potato.*

The recommendations of the Bacteriological Committee are followed. The potato, from the time the skins are removed until they are ready for sterilization, should be handled under water as far as possible to prevent darkening of the surface. The potato is cut into cylinders with a cork borer and the cylinder then cut diagonally with a broad bladed knife, thus producing two pieces similar in appearance to a solidified agar or serum slant. Non-absorbent cotton to the depth of an inch is placed in the bottom of the test tubes, and the potato slant dropped broad end downward upon the cotton. An excellent method for preventing the potato from

<sup>1</sup> Smith recommends the *subsequent* addition of a small quantity of dextrose. (See Journal Boston Soc. Med. Sc. 1899.)



drying up or changing color consists in filling the tubes, before final sterilization, with sufficient sterile water to cover the potato completely. The tubes are kept in the ice chest, retaining this water. Before use, the lip of the test tube is flamed and the water poured out, the lip of the test tube again flamed and the inoculation proceeded with.

### *Milk.*

The recommendations of the Bacteriological Committee are followed. The practicability of using Nutrose (sodium-phosphate of casein) in solution as a substitute for milk is now being investigated in this laboratory.

### *Liquid serum for gonococcus culture.*

The blood serum, with or without filtration through a broth coagulum (see Loeffler's serum) is added slowly with constant stirring to a boiling solution of Nutrose (a commercial preparation of Casein-sodium-phosphate) containing a little glycerine. The resulting opalescent solution is filtered, tubed and sterilized. Its reaction is about +0.3 (0.3 per cent. acid). The proportions are as follows:

Water . . . . .	100 parts.
Nutrose . . . . .	2 parts.
Glycerine . . . . .	6 parts.
Boil; add slowly, with stirring, serum . . . . .	40 parts.

Sterilize three times on consecutive days for fifteen minutes each day. This liquid serum is mixed in equal parts with melted nutrient agar containing 2 per cent. peptone, of about +0.8 (0.8 per cent. acid) reaction, both being held at a temperature of 50° C. The suspected gonococcus-containing matter is then plated, using this mixture, or the mixture cooled in slants and streak cultures made on the slants.<sup>1</sup>

### *Storage of Media.*

Media of all kinds are kept for use, ready tubed, in square wire baskets which the writer finds most convenient when not more than four inches deep, the tubes being five and six inches long. This ensures the projection of the tubes above the top of the basket and makes their handling more easy. Each basket is labelled with the name of the medium (broth, plain agar, glycerine agar, etc.), the date of its preparation and a number corresponding with the records kept of its

<sup>1</sup> Wasserman, *Zeitsch. f. Hygiene*, 27, 1898.

preparation. An excellent label consists of a small piece of aluminum foil attached to the basket by a wire ring. The name can be written on the foil with the blue Faber pencils used for writing on glass. These labels have the advantage that they will pass through the steam sterilizer without effacement. The baskets of media are kept in a refrigerator. The writer finds that drawers with perforated sides and bottoms, fitted into the lower part of an ordinary refrigerator, make the most convenient method of storage. When tubes are removed from any basket for use, the name of the medium and its number is copied from the aluminum label on the test tube label. Thus every culture made carries with it a reference to the records showing when and how the medium was prepared, its exact composition, etc.

## SUMMARIES OF BACTERIOLOGICAL EXAMINATIONS.

*Diphtheria Diagnosis.*— The diphtheria diagnostic work was transferred to this laboratory from the Harvard Medical School, May 10, 1898. Table I. shows the weekly receipt and examination of cultures from that date to January 31, 1899, during the nine months remaining to the end of the department year. The totals for each week are made up on each Saturday, and include the cultures received from the previous Saturday to the immediately previous Friday inclusive. From May to the end of July the number falls off, remaining low through August, after which a gradual rise occurs, reaching its maximum towards the middle of November. About the middle of December, a local epidemic in one of the city institutions (Home for Little Wanderers) resulted in a very decided rise with its maximum in the first week of January, 1899, followed by a fall to the end of the month. The primary positive cases follow this curve, with minor variations, fairly well up to the beginning of November. Thereafter the prompt removal of suspicious cases at the Home for Little Wanderers to the City Hospital as clinical symptoms developed resulted in the obtaining of but few primary positives at the laboratory, the large rise in total cultures being due partly to secondary positives, but chiefly to negative cultures obtained during the frequent wholesale search for diphtheria bacilli by culture amongst the inmates of the home. The curve of primary negatives follows that of total cultures closely, thus corresponding with the fact, well brought out in subsequent tables, that the distinguishing characteristic of diphtheria diagnosis in Boston is the large number of negative cases sent in for diagnosis as well as for release. It must be remembered that primary positive cultures do not represent new cases of diphtheria in all cases, since only a portion are for diagnosis, a considerable portion being cultures for release on cases which were not examined bacteriologically during the early stages of the disease, but were reported as diphtheria solely on clinical evidences. The same thing is true of the primary negatives, which likewise include cases for diagnosis and release. Primary cultures represent cases new to the laboratory, not necessarily cases freshly developed.

Table II. shows (A) the classification of the total primary cultures into those for diagnosis and those for release, and the same classification for the secondary cultures. Here the primary cultures for diagnosis represent new diphtheria cases, the secondary cultures for diagnosis representing

further tests on cases where the first culture failed to give results satisfactory to the physician (*i.e.*, by failing to coincide with the clinical evidence) or to the laboratory (*i.e.*, by yielding growths of fungi, of liquefying organisms, or occasionally no growth at all). These cultures, unsatisfactory from the laboratory standpoint, are classed as "no growths," a convenient but not very accurate term, continued from the Harvard Medical School as being already established and sufficiently well understood by the profession. As previously explained, primary cultures for release, whether positive or negative, represent cases reported as diphtheria on the clinical evidence alone and not examined bacteriologically except for the determination of the disappearance of bacilli, previous to the official termination of isolation. The total primary cultures indicate, necessarily, the total number of *cases* examined. These cases are classified (B) on the basis of the first positive or negative culture received, omitting the "no growth" cultures except where these were the only cultures received. The final classification of cases is given (C) and again (D), omitting in the latter table the cases from the Little Wanderers' Home, since the cultures from the latter, owing to the special object for which they were taken, cannot be classed with the ordinary run of cultures from private practice without conveying false impressions from the totals given. Table III. shows the distribution of membrane in such cases as yield sufficiently full data, showing the original clinical diagnosis and the final bacteriological diagnosis for each case. Below is given a summary, showing the number of times each principal and usual site of lesion was affected in the positive and also in the negative cases. It is evident that the tonsils, either alone or in combination with other sites, present lesions in the greater number of cases, both positive and negative.

Table IV. (A) summarizes the relation of the presence and absence of membrane to the bacteriological diagnosis. It will be seen that seventeen cases only out of 1,213 presented for diagnosis, yielded diphtheria bacilli in the absence of membrane or exudate of some kind, less than 1.5 per cent. These cases, however showed symptoms, sore throat, fever, etc., and also were so situated that a suspicion of developing diphtheria attached to them. On the other hand, 98.6 per cent. of cases which proved positive presented a membrane of some kind, so described by the attending physician. Table IV. (B) gives the results of examinations of cases simply exposed to diphtheria but without symptoms. The number examined, however, was too small to afford much basis for

comparison. Table IV. (C) shows, so far as the records will allow, the working error of the bacteriological examination as it exists when but one culture is taken for diagnosis. Thus it will be seen that only 92.5 per cent. of cases which subsequently yielded diphtheria bacilli and in which there can be little doubt that diphtheria bacilli were present at the time of taking the culture, yielded positive cultures at the first attempt. Since 1.9 per cent. of the total positive cases yielded "no growths" at the first attempt, a really misleading diagnosis of negative, *i.e.*, where the case was really positive, was obtained in but 5.8 per cent. of cases. A "no growth" result cannot be classed as misleading since it gives no information whatever as to diagnosis. If two cultures be taken for diagnosis, however, a misleading result will be obtained in less than 1 per cent. of cases. Of course, it must be remembered that "no growths" and negative cultures obtained from cases in which the bacilli are present, depend partly upon more or less unavoidable circumstances as well as sometimes on technical errors.

Table V. shows the termination of diphtheria cases. At (A) are classified the cases which were submitted to the laboratory for diagnosis, showing those that were sent to the hospital or died or in other ways failed to come to us for cultural release, as well as those which did so come, and showing also the number of negatives for release obtained before release was granted for all the cases. Of course negative cases for diagnosis never come in for release. In twenty-six cases, the only cultures which were sent in showed "no growth" and were not further heard from. At (B) those cases are given which were reported to the Board of Health on clinical evidence only and on which cultures were not obtained until release was desired. At (C) is given a summary of cultures obtained during the release of all those cases which were released by us, showing particularly how many cases yielded negative cultures followed by positive cultures. Such negative cultures are designated as "premature negatives" since they appear to demonstrate the absence of the bacilli before the bacilli have in fact gone. At (D) a further summary is given, illustrating the value of requiring two consecutive negatives for release, as a protection to the public health.

Table VI. gives some interesting comparisons between clinical and bacteriological diagnoses, showing the great discrepancy when the physician calls the case diphtheria and the much smaller discrepancy when the physician states the diagnosis as "not diphtheria." In "doubtful" cases, so

described by the physicians, the percentage discovered to be diphtheria is only slightly larger than when the physician states the case to be innocent.

The percentage of reversed diagnoses existing when the clinical diagnosis is positive, is very different from that found when the clinical diagnosis is negative. Moreover, in different years and in different laboratories, the proportion of positive clinical to negative clinical diagnoses varies. Hence, the total concordance obtained varies to some extent with the relative number of positive and negative clinical diagnoses. By considering a hypothetical case in which the numbers of each clinical diagnosis were equal, a theoretical standard is made, eliminating this factor.

In Table VII. are given some calculations showing the average duration of diphtheria cases under bacteriological supervision and of the four important bacteriological stages of the disease. In A, B, C and D, are given further tables showing for the cases averaged, the percentage which yielded periods less than certain arbitrarily chosen figures. Cases lasting more than four weeks are tabulated at E.

*Typhoid Diagnosis.* — The typhoid diagnosis service was not organized until July, 1898. From that time to the end of the department year, one hundred and twenty-two preparations were examined. The appended tables will bring out the chief features of these examinations. The comparatively small number of tests, however, renders it useless to go into the subject very exhaustively. It may, however, be pointed out that about 68 per cent. of those cases which finally yielded positive Widal reactions, yielded the reaction on one preparation, whereas in the diphtheria diagnosis about 92 per cent. of cases, finally yielding positive cultures, yield the positive result on one culture. Ordinarily two Widal tests at least, better three or four, should be found negative, before a positive clinical diagnosis is reversed on the strength of the test. On the other hand a positive Widal reaction seems to be almost absolute evidence of the presence of typhoid fever, or at least of typhoid fever bacilli, if the persistence of the reaction from a previous attack can be excluded.

*Rabies.* — A small epidemic of rabies developed in Boston during December, 1898. The heads of three animals were submitted to the laboratory for examination and physiological tests. The following results were obtained:

	Date of death.	Date received at laboratory	Date of inoculation of rabbit.	Date of earliest symptoms in rabbit.	Nature of symptoms	Date of death.	Diagnosis.
Setter.....	Dec. 1.	Dec. 5.	Dec. 5.	.....	.....	*	Negative
Bulldog.....	Dec. 8.	Dec. 9.	Dec. 9.	Dec. 21.	Paralysis	Dec. 23.	Positive
Terrier .....	Dec. 30.	Dec. 31.	Jan. 2.	.....	.....	†	Negative

\* Living April 27, 1899.

† Living March 1, 1899.

Three inoculations — two negative, one positive.

*Notes on the positive case :*

This bulldog developed symptoms about the end of November. It was owned in Dorchester. The usual symptoms of rabies were well marked. A number of dogs were bitten, of which one at least, a water spaniel, developed suspicious symptoms within two or three weeks of receiving the bite. Unfortunately this spaniel was chloroformed by the owner, and it was impossible to obtain its brain. A boy, bitten by the bulldog, was sent to the Pasteur Institute in New York for treatment. Up to the end of April no symptoms had developed. The autopsy on the bulldog revealed no marked lesions of any kind, nor did the rabbit inoculated from it show any marked lesions on autopsy. An emulsion of this rabbit's brain was inoculated into a second rabbit, which showed symptoms (convulsions) on the tenth day, dying within twelve hours later. A third rabbit was then inoculated from the second, and this series has been since kept up, in order to provide for the establishment of a Pasteur treatment in Boston, should this become necessary, and for the study of the disease in any case. A complete account of this work is reserved until the next annual report. A summary of the results so far obtained is, however, appended.

## Series of Inoculations of Rabies in Rabbits.

Rabbit.	Inoc. from.	Date of inoc.	Weight on date of inoc.	Date of earl. symp.	EARLIEST SYMPTOMS IN DETAIL.	Date of death.	Weight at death.
No. 1	bulldog	Dec. 2, '98	(grams) 1,925	Dec. 21, '98	Hyperaesthesia, followed by paralysis.	Dec. 23	(grams) 1,925
No. 2	No. 1	Dec. 27, '98	2,160	Jan. 6, '99	Hyperaesthesia, with convulsions.	Jan. 6	1,985
No. 3 <sup>1</sup>	No. 2	Jan. 9, '99	2,650	Jan. 22	Extreme weakness, with convulsions.	Jan. 26	1,970
No. 4	No. 3	Feb. 2	1,900	Feb. 11	Hyperaesthesia and weakness.	Feb. 12	....
No. 5	No. 4	Feb. 14	2,085	None.	None observed.	Feb. 23	2,070
No. 6	No. 5	Feb. 23	2,655	Mar. 2	Convulsions.	Mar. 5	2,080
No. 7	No. 6	Mar. 6	2,290	Mar. 14	Convulsions, weakness.	Mar. 14	2,060
No. 8	No. 7	Mar. 15	1,880	Mar. 23	Convulsions, weakness.	Mar. 26	1,715
No. 9	No. 8	Mar. 27	2,340	Apr. 6	Paralysis and convulsions.	Apr. 6	2,340
No. 10	No. 9	Apr. 7	1,890	Apr. 16	Paralysis and convulsions.	Apr. 20	1,530

<sup>1</sup> Gave birth to eight young ones January 11.

Thus the intervals from inoculation to earliest symptoms and to death were as follows :

RABBITS NO.	1	2	3	4	5	6	7	8	9	10
Days to earliest symptoms.....	13	10	13	9	9	7	8	8	10	9
Days to death .....	15	10	17	10	9	10	8	11	10	13

*Glanders.* — Up to the end of the department year, veterinarians had not begun to avail themselves of the service organized at the beginning of the last month of 1898. Dr. Burr, the veterinarian of the Board, however, had employed the services of the laboratory for some time in this direction. Some nine inoculations for diagnosis were made previous to January 31, 1899, of which one only gave a positive result.

*Gonorrhoea.* — Seven cases were examined, of which three proved positive, four negative.



*Influenza.* — During the epidemic of the winter of 1898–99, a temporary service was organized, but only three cases were submitted for examination, all of which proved negative.

A number of other examinations were made, including two cases of puerperal septicaemia, two cases of septic wounds, a case of otitis media, a case of peritonitis and a case of suspected malaria. A microscopic examination of water from a tenement house disclosed the presence of sewage contamination. It was found that an inmate of the house had been emptying household slops into the tank from which the supply was drawn. An investigation of the material used in coloring sausages was carried out also. The particular preparation submitted proved to be Bismarck Brown, flavored with wintergreen. It was injected in strong solution into a guinea pig without ill effect. A number of other questions were also submitted to the laboratory and reported on during the year. Thus, samples of vaccine virus which showed a brown color were found under the microscope to contain a number of blood cells accounting for the color. This virus was rejected. Plans for the sterilization, or Pasteurization of milk for the poor of the city, were submitted for consideration and reported on. Advice on the subject of sterilization of towels and bathing suits was furnished to the Bath Department; also on the cleansing and disinfection of public convenience stations; also on the disinfection of books belonging to the Public Library and in the possession of inmates of houses at the time of an outbreak of contagious disease. An investigation of the transmission of disease-producing bacteria by means of the public telephone service was begun, and arrangements for the investigation of the ice supply of Boston were undertaken; the results of this work will be published in a subsequent report.

#### DISINFECTANTS.

*Electrozone.* — This disinfectant is produced by the passage of an electric current through salt solutions or sea-water resulting in the formation of chlorinated soda, chlorinated lime or chlorinated magnesia, according to the salt used. From sea-water, mixtures of several such chlorinated bodies are produced, that of magnesia being most abundant. The exact details of manufacture of the samples tested could not be obtained.

Two different forms were examined bacteriologically. One was the product of a plant owned and operated by the Philadelphia Board of Health, the other was produced by the Woolf

Manufacturing Company, of New York. The experiments extended over a considerable period. The following investigations were carried out, parallel experiments being made with chlorinated soda, or chlorinated lime, in each case of the same strength and as nearly as possible of the same age :

1. Bactericidal action :

- (a.) Broth method : { In different strengths with different  
bacteria and with different lengths  
(b.) Rod method : { of exposure.

2. Physical and chemical action :

Turbidity, odor, available chlorine (volumetric), alkalinity (volumetric), keeping power ; action on metals, dyes, fabrics, on albumens, fats, soaps ; effect on the disinfectant of light, heat, exposure to air.

3. Convenience in handling and in storage, applicability and cost.

The investigation was exhaustive, and involved many separate experiments. It is sufficient to say here that the results confirmed the published results of many previous investigators, showing that there was no practical difference in chemical, physical or bactericidal properties between a solution of chlorinated soda and that form of electrozone of equivalent strength which was sent to the laboratory from Philadelphia, nor between a solution of chlorinated lime and that form of equivalent strength sent to the laboratory from New York. Chloride of lime, in powder, is practically a condensed electrozone. The storage, transport and handling of electrozone as compared with chloride of lime in powder is equivalent to the storage, transport and handling of a 1 per cent. solution of chloride of lime compared with chloride of lime in powder. In the matter of convenience, then, the choice lay between a powder which could at any time be converted into a bulky solution, and a bulky solution which could not at any time be reduced to a powder, under practical conditions. Further, inasmuch as the available data showed the cost of manufacture of electrozone to be greater than the cost of purchasing chloride of lime or of making chlorinated soda from chloride of lime from the U. S. P. formula, the recommendation to adopt electrozone for municipal purposes was withheld.

*Formalin.* — Dr. Brough, Medical Inspector of the department, continued an investigation of the action of formalin in practical house-to-house disinfection during the nine months

covered by this report. His previous results have been elsewhere published. *Med. Com. Mass. Med. Soc.*, Vol. xvii-iii, 1898. His summary of results obtained in the further work carried on in this laboratory is as follows:

Since the establishment of the laboratory some further experiments have been made with formaldehyde as a disinfectant. In our first series of experiments carried on during the previous year, a very large number of tests were made under all sorts of conditions. The experiments were carried on in houses where some sort of contagious disease had occurred. The general conclusions then established were:

1. That formaldehyde gas is the best practical disinfectant at present known for the disinfection of rooms.

2. That its disinfecting power is chiefly superficial.

3. That it has practically very little penetrating power. Where deep disinfection is required formaldehyde can not be relied upon.

4. That it is perfectly harmless to all classes of household goods. In the large number of houses disinfected there has been no complaint of injury to any articles.

5. The results are obtained from the gas, and any machine that will produce sufficient gas will give satisfactory disinfection. We believe from the results of a large series of tests that at least twenty ounces of the 40 per cent. solution of formaldehyde should be used to every 1,000 cubic feet of space in ordinary rooms. In practice our disinfectors use somewhat more, and our results are very satisfactory, and as thorough as can be obtained in houses.

The method of disinfection in use here is as follows: The bedding, clothing, mattresses, and other articles are spread out in such a way as to give as large a surface as possible to the action of the gas. Drawers, doors of cupboards, closets, etc., are opened widely so that the gas may have free range inside. All the windows are tightly closed, and the cracks are pasted over with strips of paper, which are made for the purpose. All other loose places, through which the gas might escape, are likewise sealed in the same manner. The door is closed and locked. The crevices are covered with the gummed paper. The gas is then introduced through the key-hole by a pipe which leads from the autoclave, in which the gas is generated from the 40 per cent. solution. The attendant remains with the machine until a sufficient amount of gas has been driven into the room. Experience has taught about the length of time it takes to drive in an amount necessary to properly disinfect. Careful measurements are made of the

amount of formaldehyde solution present before, and the amount remaining after disinfection. So far as our experience goes, this seems the most economical way of generating the gas.

In making the tests the *staphylococcus pyogenes aureus*, the *bacillus anthracis*, the typhoid bacillus, and the diphtheria bacillus were regularly used. These organisms were grown on blood serum or agar slants. From the fresh culture the organisms were spread over the ends of sterilized glass rods and allowed to dry. These rods, placed in sterilized test tubes, with the mouths properly plugged, were taken to the rooms requiring disinfection, and then removed from the tubes and placed in suitable situations. After an exposure of six hours they were taken out and immediately inoculated on blood serum or agar slants. These cultures were then removed to the laboratory and kept in the incubator for 72 hours. Any growth that appeared at the end of this time was examined by the proper bacteriological methods to determine its exact nature. We found this a very simple method, as the number of transfers into nutrient media was less than by the other methods. It was at the suggestion of the Director of this Laboratory that this method was used. We found that the action of formaldehyde did not differ in results from those that were obtained when silk threads and other materials were used. The labor in making experiments was much diminished by using the glass rods.

Besides generating the gas from the solution, many tests were made with the gas generated from the solid polymers of formaldehyde, either as the solid pastiles or as the trioxymethylene powder.

The results of these experiments were practically the same as our tests in the year previous had developed. At that time many claims were put forth by manufacturers that certain machines of their make would give excellent results by using small amounts. Some experimenters claimed to get complete disinfection by using from 4 to 6 ounces to every 1,000 cubic feet. Under certain favorable conditions these results can be obtained, but in ordinary disinfection of houses small amounts are not reliable. A long line of experiments beginning with 4 ounces to the 1,000 cubic feet were made. This amount was gradually increased until we arrived at the large amounts we are now using. We found, we admit, at times very good disinfection with small amounts, but more often there was only partial or no disinfection. As we increased the amount, the efficiency of the disinfectant increased and the inconstant and varying results seldom or

never appeared. We found that it was the gas in sufficient amount that performed the work.

The same results were noticed in using the gas derived from the solid forms. Using the pastiles or the trioxymethylene powder as directed by the manufacturers we occasionally got good results, but often were disappointed. The only reason, we feel, that there was any variation was that sometimes not enough gas was generated. So far as we were able to judge the gas from the solid form is of the same character as that from the solution. If sufficient were generated the results would be the same, but to get enough gas from the pastiles or from trioxymethylene would cost so much as to be almost prohibitive for municipal disinfection, and would be an unnecessary expense when practically complete disinfection can be obtained from the 40 per cent. aqueous solution at moderate cost.

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An appendix is added, giving the tables referred to in the foregoing text and the printed forms used in the various diagnostic services.

All of which is respectfully submitted,

HIBBERT WINSLOW HILL, M.D.,

*Director.*

Table No. I.—Diphtheria.

WEEKLY TOTALS OF CULTURES EXAMINED.

	Total.	Primary Positive.	Primary Negative.		Total.	Primary Positive.	Primary Negative.
May 10 to May 20.....	132	21	42	Week ending Oct. 1..	82	8	34
Week ending May 27..	92	8	32	“ 8..	85	12	22
June 3..	68	6	29	“ 15..	65	10	29
“ 11..	66	4	26	“ 22..	96	15	33
“ 18..	46	6	23	“ 29..	101	15	35
“ 24..	49	6	23	Nov. 5..	110	26	35
July 2..	51	5	21	“ 12..	130	20	48
“ 9..	38	2	18	“ 19..	147	20	55
“ 16..	47	7	22	“ 26..	138	10	44
“ 23..	37	7	6	Dec. 3..	104	10	44
“ 30..	45	9	10	“ 10..	111	10	41
Aug. 6..	41	5	12	“ 17..	210	11	130
“ 13..	25	5	6	“ 24..	323	10	67
“ 20..	30	6	6	“ 31..	362	18	59
“ 27..	38	8	13	Jan. 7..	375	6	64
Sept. 3..	32	3	15	“ 14..	143	19	56
“ 10..	49	13	14	“ 21..	135	7	54
“ 17..	60	8	23	“ 28..	134	10	61
“ 24..	57	11	19	“ 29-31..	54	4	35

Table No. II. — Diphtheria.

## A. — CULTURES AS RECEIVED.

	Primary.	For Diagnosis.	For Release.	Secondary.	For Diagnosis.	For Release.	Total.	For Diagnosis.	For Release.
Positive ..	389	316	73	605	41	564	994	357	637
Negative .	1,314	1,140	174	1,557	8	1,549	2,871	1,148	1,723
No growth	44	39	5	89	0	39	83	39	44
Total ...	1,747	1,495	252	2,201	49	2,152	3,948	1,544	2,404

## B. — CASES AS RECEIVED, OMITTING PRIMARY NO GROWTHS WHEN FOLLOWED BY POSITIVE OR NEGATIVE CULTURES.

	For Diagnosis.	For Release.	Total.
Positive .....	321	74	395
Negative .....	1,148	178	1,326
No growth .....	26	0	26
Total .....	1,495	252	1,747

## CASES AS FINALLY CLASSIFIED AFTER COMPLETION, OMITTING 88 CASES FROM LITTLE WANDERERS' HOME. — TOTAL CASES.

C.				D.		
	For Diagnosis.	For Release.	Total.	For Diagnosis.	For Release.	Total.
Positive on first culture.....	316	73	389	312	73	385
Positive on following culture.....	60	10	70	24	10	34
Negative throughout.....	1,093	169	1,262	1,045	169	1,214
No growth throughout.....	26	0	26	26	0	26
Total.....	1,495	252	1,747	1,407	252	1,659

Omitting Little Wanderers' Home, the final classification of cases is as follows:

Total positive cases, 419 (25.2 %); total negative, 1,214 (73.1 %); total no growth, 26 (1.7 %) = 1,659.

With Little Wanderers' Home:

Total positive cases, 459; total negative, 1,262; total no growth, 26 = 1,747.

Table No. III. — Diphtheria.

LOCATION OF MEMBRANE AT DATE OF CULTURE.

	Total Cases.	Nares Only.	Pharynx Only.	Tonsils Only.	Larynx Only.	Nares and Pharynx.	Nares and Tonsils.	Nares and Larynx.	Nares, Pharynx, and Tonsils.	Nares, Pharynx, and Larynx.	Pharynx and Tonsils.	Pharynx and Larynx.	Pharynx, Tonsils and Larynx.	Tonsils and Larynx.	Other Situations.	Membrane Doubtful.	No Membrane.	Membrane Not Given.
<b>BACTERIAL DIAGNOSIS, POSITIVE.</b>																		
Clinical Diagnosis, positive.....	134	5	3	49	...	1	3	...	6	3	...	32	1	8	3	...	4	6
“ “ negative.....	58	1	2	33	1	1	1	...	1	...	...	10	...	...	...	...	...	5
“ “ doubtful.....	29	1	2	16	...	1	2	...	...	...	...	3	...	1	1	...	1	...
“ “ not given.....	80	2	2	39	...	...	1	1	...	1	...	10	...	1	...	1	13	10
Totals.....	291	9	9	137	1	3	7	1	7	4	...	55	1	10	4	4	17	21
<b>BACTERIAL DIAGNOSIS, NEGATIVE.</b>																		
Clinical Diagnosis, positive.....	95	...	5	53	3	...	1	...	...	...	...	18	...	1	1	...	10	2
“ “ negative.....	488	...	14	230	...	...	1	...	...	...	...	19	1	...	...	...	302	6
“ “ doubtful.....	163	1	7	75	2	...	2	...	...	1	...	15	1	1	1	...	46	1
“ “ not given.....	278	3	7	75	1	2	1	5	2	1	1	17	...	4	3	...	98	54
Totals.....	1,094	4	33	433	6	2	5	5	2	2	1	69	2	6	6	12	356	63

291 Positive Cases showed membrane on: Nares, 82; Pharynx, 89; Tonsils, 224; Larynx, 21; Vulva, 1; Arm, 1; Palate, 1; no Membrane, 17.  
 1,094 Negative Cases showed membrane (so called): Nares, 21; Pharynx, 117; Tonsils, 523; Larynx, 23; Vulva, 1; Eye, 1; Penis, 1; Mouth, 7; no Membrane, 356.



**Table No. IV. — Diphtheria.****A.****RELATION OF BACTERIOLOGICAL RESULTS TO PRESENCE OF MEMBRANE.**

	Positive Cases.	Negative Cases.			Membrane Doubtful or not Given.
Membrane present..	252 (98.6%)	588 (92.3%)	840	Bacteriological diagnosis, positive .....	24 23%
Membrane absent...	17 (6.4%)	356 (87.7%)	373	Bacteriological diagnosis, negative .....	80 77%
	269 (100%)	944 (100%)	1,213		

**B.****CASES MERELY EXPOSED TO DIPHTHERIA, SHOWING NO SYMPTOMS.**

Bacteriological diagnosis, positive .....	1
Bacteriological diagnosis, negative .....	33
Bacteriological diagnosis, no growth .....	1
Total cases .....	35

**C.****D.**

WORKING ERROR OF BACTERIOLOGICAL DIAGNOSIS.			Omitting no Growths.
Cases for diagnosis, positive on first culture.....	312	92.5%	94.2%
Cases for diagnosis, negative on first culture, positive on second culture .....	19	5.6%	5.8%
Cases for diagnosis, no growth on first culture, positive on second culture.....	5	1.9%	

Table No. V.—Diphtheria.

TABLE SHOWING TERMINATION OF CASES.

A.—CASES FOR DIAGNOSIS.					C.—STATISTICS OF RELEASE BY TWO CONSECUTIVE NEGATIVE CULTURES.					
	Removed to Hospital, Died, etc.	Released on 2 or more Negative Cultures.	Released on 1 Negative Culture.	Total.		Without Premature Negatives.	With One Premature Negative.	With Two Separate. Prem. Neg's.	With Two Consecu- tive Premature Negatives.	Total.
Positive .....	143	178	15	336	Positive for diagnosis and re- lease ....	183	58	11	5	257
Negative . . . .	not	isol ated,		1,045	Negative for release (all negative) .	158	.....	.....	.....	158
No growth .....	not	isol ated,		26	Total .....	341	58	11	5	415
B.—CASES FOR RELEASE.					D.—Thus 74 cases, released by two or more consecutive negatives, but showing also one or more premature negatives for release, formed 28.6% of the total positive cases released (257), and 17.8% of the total cases released (415).					
Positive.....	1	79	3	83						
Negative.....	.....	158	11	169						
No growth.....	.....	.....	.....	.....						
Total.....	144	415	29	1,659						

The total time between the first premature negative and the last positive on these 74 cases was 466 days, an average of 6.3 days per case. The total time between the first premature negative and the first final negative was 607 days, an average of 8.2 days per case. Since it may be supposed that the bacilli remain in the throat during half the time (on an average) between the last positive and first final negative, these 74 cases probably retained the bacilli for an average of 7.2 days after the first premature negative.

**Table No. VI.—Diphtheria.****COMPARISON OF CLINICAL AND BACTERIOLOGICAL DIAGNOSES, SHOWING  
ACTUAL RESULTS.**

CLINICAL DIAGNOSIS DEFINITE.	Cases.	Per Cent.	CLINICAL DIAGNOSIS INDEFINITE.	Cases.	Per Cent.
Bacteriological diagnosis, positive,	124	56.7	Bacteriological diagnosis, positive,	29	15.2
“ “ negative,	95	43.3	“ “ negative,	163	84.9
Clinical diagnosis, positive.....	219	100	Clinical diagnosis, doubtful.....	192	100
Bacteriological diagnosis, negative,	488	89.6	Bacteriological diagnosis, positive,	80	22.3
“ “ positive,	58	10.4	“ “ negative,	278	77.7
Clinical diagnosis, negative.....	546	100	Clinical diagnosis, not given.....	358	100
Concordant results.....	612	80	Bacteriological diagnosis, positive,	109	19.6
Discordant results.....	158	20	“ “ negative,	441	80.4
Total cases, showing Clinical diagnosis.....	765	100	Total cases, showing absence of Clinical diagnosis.....	550	100

Theoretical concordance of Clinical and Bacteriological diagnoses based on foregoing tables can only be shown by the following hypothetical calculations, using the percentages found above, taking an equal number of positive and negative Clinical diagnoses.

Cases.	Cases.
Clinical diagnosis, positive.....1,000	Clinical diagnosis, negative.....1,000
Bacteriological diagnosis, positive.. 567	Bacteriological diagnosis, negative.. 896
“ “ negative.. 433	“ “ positive... 104

Hence Concordant diagnoses number 1,463 out of 2,000 cases, or 73.1 per cen

Table No. VII.—Diphtheria.

AVERAGE TIME IN DAYS FROM EARLIEST SYMPTOMS TO RELEASE.

	Cases showing data for calculating.	Earliest symptoms to first positive culture.	First positive culture to last positive culture.	Last positive culture to first final negative.	First final negative to second final negative.
Positive cases for Diagnosis .....	266	2.5			
Positive cases for Diagnosis, showing at least one positive for release..	98	.....	16.2	4.3	
Positive cases for Diagnosis, showing two consecutive negatives for release .....	176	.....	.....	.....	2.5
Positive cases for release..	72	.....	.....	4.3	
Positive cases for release, showing two consecutive negative cultures....	72	.....	.....	.....	2.8
Negative cases for release, negative throughout ....	152	.....	.....	.....	3.3
Negative cases for release, showing at least one positive culture.....	57	.....	23.4	5.1	
Averages .....	.....	2.5	18.8	4.5	2.7
	Earliest symptoms,	To first positive.	To last positive.	To first final negative.	To second final negative.
	2.5	21.3	25.8	28.5	

## A.

PERCENTAGES OF CASES SHOWING SHORT INTERVALS BETWEEN DATE OF EARLIEST SYMPTOMS AND FIRST POSITIVE CULTURE.

		Same day.	1 day.	2 days.	3 days.	Total below 3 days.
Total cases.....	266	6.8 %	31.2 %	27.8 %	15.4 %	81.2 %

## B.

DATE OF EARLIEST SYMPTOMS TO LAST POSITIVE.

	10 days or less.	15 days.	20 days.	25 days.	Total below 25 days.
158 cases released on two negatives,	11.5 %	18.5 %	27.0 %	16.0 %	71.0 %

**Table No. VII.—Diphtheria.—Concluded.**

C.

DATE OF EARLIEST SYMPTOMS TO FIRST FINAL NEGATIVE.

	10 days.	15 days.	20 days.	25 days.	30 days.	35 days.	Total below 30 days.
158 cases.....	3.8 %	14.0 %	21.5 %	20.2 %	14.5 %	12.0 %	74.8 %

D.

FROM FIRST FINAL NEGATIVE TO SECOND FINAL NEGATIVE.

	1 day.	2 days.	3 days.	4 days.	5 days.	Total below 3 days.
Total cases, 400 .....	14.2 %	44.5 %	17.0 %	6.0 %	2.5 %	75.7 %

E.

TABLE SHOWING MORE THAN FOUR WEEKS PERSISTENCE OF BACILLI IN THROAT  
FROM DATE OF EARLIEST SYMPTOMS.

CASES.	Time to last Positive in Days.	CASES.	Time to first final Negative in Days.
7.....	35	8.....	40
5.....	40	3.....	45
2.....	45	3.....	50
3.....	50	3.....	55
1.....	55	2.....	60
1.....	60	2.....	65
1.....	65		

55 % show 20 days or less between date of earliest symptoms and last positive.

60 % show 25 days or less between date of earliest symptoms and last positive.

**Table No. 1.—Typhoid.**

WEEKLY TOTALS OF PREPARATIONS RECEIVED.

WEEK ENDING	Total.	Primary Positive.	Primary Negative.	WEEK ENDING	Total.	Primary Positive.	Primary Negative.
July 16.....	1	.....	1	November 5 ...	15	3	7
23.....	2	.....	2	12....	5	2	1
30.....				19....	9	1	2
August 6.....	1	.....	1	26....	9	1	5
13.....	1	.....	1	December 3....	5	1	4
20.....				10....	7	.....	3
27.....				17....	2	1	1
September 3.....	1	.....	1	24.....			
10.....	2	1	1	31....	1	.....	
17.....	3	1	2	January 7....	4	.....	3
24.....	3	.....	2	14.....			
October 1.....	4	1	3	21....	2	.....	1
8.....	1	.....		28....	1	.....	1
15.....	17	4	8	31....			
22.....	15	1	9				
29.....	11	2	3				

**Table No. 2.—Typhoid.**

PREPARATIONS AS RECEIVED.

	First Preparation.	Second Preparation.	Third Preparation.	Fourth Preparation.	Totals.
Positive .....	19	4	4	2	29
Negative.....	62	13	1	.....	76
Atypical.....	12	1	.....	.....	13
Preparations not in proper condition.....	3	1	.....	.....	4
Totals.....	96	19	5	2	122

**Table No. 2.—Typhoid.—Concluded.**

CASES AS FINALLY CLASSIFIED AFTER COMPLETION.

	Cases.	Per Cent.	Negative or Atypical Throughout.	Cases.	Not Examined.
Positive on first preparation .....	19	68.00	One preparation only.	49	.....
Positive on second preparation after negative results .....	2	7.14	Two preparations. ....	7	.....
Positive on second preparation after an atypical result. ....	2	7.14	Atypical, then negative. ....	3	.....
Positive on third preparation after two negative results .....	2	7.14	Atypical only (one preparation) .....	7	.....
Positive on third preparation after two improper preparations .....	1	3.57	.....	.....	.....
Positive on third preparation after atypical and negative results. ....	1	3.57	.....	.....	.....
Positive on fourth preparation after three negatives .....	1	3.57	.....	.....	.....
Totals .....	28	.....	.....	66	2

**Table No. 3.—Typhoid.**

RELATION OF BACTERIOLOGICAL RESULTS TO PRESENCE OF ENLARGED SPLEEN AND ROSE SPOTS.

Spleen Enlarged.	Rose Spots.	Positive Cases.	Negative Cases.	
+	—	7	28	
—	+	1	1	
+	+	13	5	
—	—	2	10	
+	?	2	.....	
?	—	1	.....	
?	?	2	.....	
Total positive cases. ....	28	28	44	In other negative cases, data was incomplete.
Total negative and atypical cases. ....	66			

A previous attack of typhoid fever was recorded for three negative cases. In one case the attack had occurred twenty-six years before. In the other two, no time was given. Two preparations from each case were examined. None of the twenty-eight positive cases had had typhoid fever previously, so far as recorded.

**Table No. 4. — Typhoid.**

COMPARISON OF CLINICAL AND BACTERIOLOGICAL DIAGNOSIS, SHOWING ACTUAL RESULTS.

	Cases.	Percentages.	Percentages omitting atypical results.
Clinical diagnosis positive .....	43		
Bacteriological diagnosis positive .....	19	44.2 %	43.7 %
Bacteriological diagnosis negative.....	20	46.5 %	51.3 %
Bacteriological diagnosis atypical.....	4	9.3 %	

	Cases.	Percentages.		Cases.	Percentages.
Clinical diagnosis negative.....	8		Clinical diagnosis doubtful or not given.....	43	
Bacteriological diagnosis negative.....	7	87.5 %	Bacteriological diagnosis positive.....	8	18.6 %
Bacteriological diagnosis positive.....	1	12.5 %	Bacteriological diagnosis negative.....	32	74.4 %
Bacteriological diagnosis atypical.....			Bacteriological diagnosis atypical.....	3	7.0 %

## TOTAL CASES SHOWING CLINICAL DIAGNOSIS.

	No. of Cases.	Percentages.
Total .....	51	
Concordant diagnosis .....	26	51 %
Discordant diagnosis .....	21	41 %
Unsettled .....	4	8 %

## THEORETICAL CONCORDANCE, GIVEN AN EQUAL NUMBER OF POSITIVE AND NEGATIVE CLINICAL DIAGNOSIS.

Concordant diagnosis .....	65.8 %
Discordant diagnosis .....	29.5 %
Unsettled .....	4.7 %



**Table No. 5.—Typhoid.**

TABLE SHOWING STAGE OF DISEASE AT WHICH EXAMINATIONS WERE MADE.

		CASES POSITIVE ON ONE EXAMINATION.	CASES POSITIVE ON SECOND EXAMINATION.	CASES POSITIVE ON THIRD EXAMINATION.	CASES POSITIVE ON FOURTH EXAMINATION.
		Number of Cases.	Number of Cases.	Number of Cases.	Number of Cases.
Days .....	6	1			
Days .....	8	3			
Days .....	10	2	1		
Days .....	12	1		1	
Days .....	14	4	1		
Days .....	16			1	
Days .....	18		1		
Days .....	20		1	1	
Days .....	22	3			
Days .....	26				1
Days .....	32	1			
Days .....	42	1			
Days .....	44			1	
Days .....	46	1			
Days .....	52	1			
Doubtful.....	.....	1			

**Table No. 6.—Typhoid.**

TABLE SHOWING PARTICULARS OF EXAMINATIONS.

Dilution—One part of blood, with ten of water and ten of typhoid broth culture; i.e., dilution, 1 in 20, approximately.

Time of observation—One hour.

POSITIVE CASES.—AGGLUTINATION AND LOSS OF MOTILITY OCCURED IN.

Time in minutes.....	5	10	15	20	25	30	35	40	45	50	55	60
Preparations ...	1	1	1	.....	.....	12	1	2	4	2	.....	5

TABLE OF ATYPICAL CASES.

Number showing agglutination without loss of motility ..... 8  
 Subsequent preparations were positive in two cases; negative in two cases.  
 Number showing loss of motility without agglutination ..... 2  
 No subsequent preparations were made.

**Circulars of Instructions and Forms Adopted for the Use of the Laboratory in Making Diagnosis.**

[CIRCULAR No. 1.]

**DIPHTHERIA DIAGNOSIS.***Directions for Making Cultures.*

No local antiseptic application should be made for at least two hours previous to taking the culture. The patient's throat should also be cleared of any adherent food particles, etc.

Rub the cotton swab gently but freely against any visible exudate or pseudo-membrane, revolving the wire between the fingers in such a manner as to bring all portions of the swab in contact with it. In the absence of exudate, and when the exudate or pseudo-membrane cannot be reached, as in some cases where it is confined to the larynx or under any other conditions, pass the swab back as far as possible and rub it freely as above described over any inflamed mucous membrane which may present itself in the pharynx or on the tonsils.

Withdraw the cotton plug from the serum-tube, taking care that the portion of the plug which is to be replaced in the tube does not come into contact with the fingers or other substance.

Insert the infected swab into the serum-tube and rub it gently but firmly back and forth over the entire surface of the serum, revolving the wire so as to bring all portions of the swab in contact with the serum. Do not break the surface of the serum by pushing the swab through it.

Replace the infected swab in its own tube, and replace the cotton plugs in both tubes.

It is evident from these directions that the cotton swab should touch nothing but the suspected area and the surface of the serum from the time it is withdrawn from the swab-tube until it is replaced therein.

Mark the serum-tube label with the patient's name. Fill out the accompanying card in detail and return the whole outfit, repacked as when first opened, to the nearest culture station.

Unsatisfactory results may follow from failure to carry out these directions closely.

If the culture reaches the culture station before 4 P.M., or the Bacteriological Laboratory up to 6 P.M., a report will be mailed before 1 P.M. on the following day, or a report by telephone may be obtained by calling up No. 95 City Hall not earlier than 10 A.M. *If requested*, a telegraphic report will be sent at the physician's expense.

It is the earnest desire of the Board of Health that the service in the bacteriological diagnosis of diphtheria be maintained in as perfect a condition and as useful to physicians as possible.

If the bacteriological diagnosis does not harmonize with the clinical facts, or if any defects in the service arise, physicians are earnestly requested to report these promptly to the Director of the Bacteriological Laboratory, together with any suggestions.

Knowledge of these discrepancies and defects can only reach the Board of Health through such reports, and the service can only thus be maintained in a state of thorough efficiency.

[CIRCULAR No. 2.]

**BACTERIOLOGICAL DIAGNOSIS OF DIPHTHERIA.**

For the purposes of the Board of Health the following classes of conditions are recognized in the bacteriological diagnosis of diphtheria :

**I. The presence of the bacilli of diphtheria in preparations —**

1. From an exudate or apparent pseudo-membrane situate in the nasal passages, pharynx or adjacent areas, is regarded as positive evidence of the existence of diphtheria.

2. From an inflamed tract of mucous membrane in the nasal, pharyngeal or neighboring passages, *without* the presence of a pseudo-membrane, is regarded as indicating
  - a. An early stage of diphtheria, the pseudo-membrane having failed to develop; or
  - b. A late stage of diphtheria, the pseudo-membrane having disappeared; or
  - c. If accompanied by the laryngeal symptoms of "croup" or "membranous croup" as indicating the presence of diphtheria of the larynx or associated structures.
3. From the otherwise apparently healthy mucous membrane of these passages as indicating
  - a. Infection of the mucous membrane without further development of the disease, such as sometimes occurs in those exposed to infection.
  - b. A late stage in a case of diphtheria where, after disappearance of all clinical symptoms, bacilli nevertheless still remain.

*In these cases the subject is dangerous to himself or others until the bacilli have disappeared or lost virulence.*

Ordinarily the bacilli will have disappeared from the infected areas in cases of diphtheria within two or three weeks after the disappearance of the pseudo-membrane. It is the custom of the Board to require *that two consecutive cultures shall prove negative*, the last one to be taken by the Medical Inspector of the district, after the disappearance of the false membrane, *before the case is pronounced free from danger* or further isolation pronounced unnecessary. Occasionally the period during which the bacilli persist is much extended. Investigation has shown that in such cases virulence is *usually* retained, so that the patient *usually* remains a source of possible infection to others until the bacilli disappear. In all such prolonged cases, however, the Board will test the virulence of the bacilli found; such tests usually require about one week for their completion.

## II. The *absence* of the bacilli of diphtheria from preparations —

1. From an exudate or apparent pseudo-membrane in the nasal, pharyngeal or neighboring passages (especially if scarlet fever or other acute specific fever is also present) is regarded as strong presumptive evidence of the *absence* of diphtheria. Should doubt exist, a second and even third examination is advised.
2. From the above-mentioned areas showing inflammation without an exudate or pseudo-membrane is regarded as indicating the absence of diphtheria. This evidence, however, is not absolutely conclusive because
  - a. The bacilli, very occasionally fail to appear in preparations made during the very early stages of diphtheria. If the subject has been exposed to diphtheria infection, a single culture should not be relied upon for final diagnosis where any doubt exists.
  - b. The bacilli, although present, may fail to appear in single preparations made during the later stages of diphtheria, after the disappearance of the pseudo-membrane. In all such cases the Board requires *two* consecutive negative cultures before pronouncing the patient free from danger. (See above.)

In cases of suspected Laryngeal Diphtheria where cultures from the pharynx yield negative results, it is requested that special efforts be made to obtain cultures from the site of the lesion itself. If this cannot be affected by the wire and swab usually accompanying the culture outfit, a longer wire will be furnished on application to the Bacteriological Laboratory.

*Card to be Filled Out by the Physician.*

## FRONT.

[FORM 4.]

[To be filled out by the bacteriologist only.]

## BOSTON HEALTH DEPT.

DIPHTHERIA: Case No.

D

Received

[To be filled out by physician only. See other side also.]

Date of Culture	Hour	A.M.	P.M.
For Diagnosis ?	For Release ?		
Patient's Name	Age	Sex	
Patient's Address			
Date of Earliest Symptoms	Source of Infection		

## BACK.

[To be filled out by physician only. See otherside also.]

Membrane present ? Nares ? Pharynx ? Tonsils ? Larynx ?  
 If no membrane exists, state site of inflammation  
 Constitutional Symptoms  
 Clinical Diagnosis  
 Remarks  
 Physician's Name  
 Physician's Address

[Please fill out both sides of card as indicated, for every culture made.]

## [CIRCULAR No. 3.]

## TYPHOID DIAGNOSIS: WIDAL REACTION.

*Directions for Taking the Blood.*

1. Cleanse the skin of the lobe of the ear, avoiding the use of bichloride of mercury, carbolic acid or other strong re-agent. Soap and water, followed by alcohol and ether, is recommended.
2. Prick the lobe deeply to ensure a free escape of blood, manipulating the lobe with the fingers, if necessary, to secure a sufficient amount. A surgical needle or pointed tenotome may be used for the puncture.
3. Avoiding the first two or three drops which exude, touch the freshly escaped blood with the loop of the wire accompanying the outfit several times, in order to secure *one full* drop. Since the Widal method is quantitative, care should be taken to fill the loop completely, but no more than *one* such loopful is required.
4. Deposit the *whole* drop of blood on the exposed surface of the foil accompanying the outfit, and allow it to dry completely; do not use heat to hasten the drying.
5. Cleanse the wire loop, fill out the accompanying card and repack the outfit, placing the filled-out card over the foil, and enclose the whole in an envelope to the Bacteriological Laboratory.

A report will be mailed on the day following receipt of the preparation, or a report by telephone may be obtained by calling up telephone City Hall 95 not earlier than 11 A.M. If requested, a telegraphic report will be sent at the physician's expense.

[CIRCULAR No. 4.]

## SERUM DIAGNOSIS OF TYPHOID FEVER.

The Board of Health desires to call attention to the following statement of the results obtainable by the test for typhoid fever depending on the Widal reaction

1. The *presence* of the reaction in the blood, under the conditions imposed for the test, may be regarded as indicating the existence of typhoid fever, *provided* that the patient from whom the blood is taken has not previously had typhoid fever.

2. The *absence* of the reaction cannot be looked upon as conclusive of the absence of typhoid fever, because:

a. The reaction is very rarely definite during the first week of the attack. Preparations before the fifth day are almost always negative.

b. The reaction is sometimes delayed until the third or fourth weeks.

c. The reaction may be well marked on some days during an attack, feeble or absent on others.

3. The *degree* of reaction obtained does not bear definite relationship to the severity of the disease.

Notwithstanding the above, for practical diagnostic purposes a single *positive* reaction may be taken as pointing to the presence of typhoid fever, a single *negative* reaction, after the seventh day of the attack, as pointing to the *probable* absence of typhoid fever. In this latter case, only repeated tests can make the exclusion of typhoid fever definite.

*Card to be filled out by the Physician.*

FRONT.

[FORM 15.]

TEL. CITY HALL 95.

## BOSTON HEALTH DEPARTMENT.

LABORATORY.

[To be filled out by the bacteriologist only.]

TYPHOID: Case No.	D.	Rec'd
Ag.	L.M.	T.
		Dil.

[To be filled out by the physician only. See other side also.]

Date of Taking Blood	Hour	A.M.	P.M.
Patient's Name	Age	Sex	
Patient's Address			
Date of Earliest Symptoms	Where Contracted		
Has Patient had Typhoid Fever before?			
If so, when? (month and year)			

BACK.

[To be filled out by the physician only. See other side also.]

SYMPTOMS.	Diarrhœa?	Constipation?
Spleen Enlarged?		Rose Spots?
Headache?		Tongue
Epistaxis?	Temp.	
Pulse		Respirations
Clinical Diagnosis		
Remarks		

Should this preparation prove negative do you wish to take another?

[If answered "yes," a fresh outfit will be mailed with the report.]

Physician's Name

Physician's Address

[Please fill out both sides of card as indicated, for every preparation made.]

## BOSTON HEALTH DEPARTMENT.

When the blood is *dry*, lay the accompanying card, filled out as shown, on this side, and replace the outfit in its case.

DO NOT REMOVE THE FOIL.

Write patient's  
name on this label.

(Aluminum foil is  
inserted in this  
space.)

Place the blood  
inside the square  
marked on the foil.

Do not heat the wire; clean with alcohol and ether.

(Copper wire loop is inserted here.)

RETURN THE WIRE.

*Outfit card for obtaining blood for the Widal test.*

[CIRCULAR No. 6.]

## MALARIAL DIAGNOSIS.

*Directions for Taking the Blood.*

Take the blood during a paroxysm if possible, and before quinine is administered.

1. Cleanse the skin of the lobe of the ear, avoiding the use of bichloride of mercury, carbolic acid or other strong reagent. Soap and water, followed by alcohol and ether, is recommended.

2. Prick the lobe deeply to ensure a free escape of blood, manipulating the lobe with the fingers, if necessary, to secure a sufficient amount. A surgical needle or pointed tenotome may be used for the puncture.

3. Wipe off the first two or three drops which exude with a clean cloth, and touch the *freshly* escaped blood with the edge of a perfectly clean square coverslip, so as to secure a very small drop.

4. Draw the edge of the coverslip to which the drop is attached over the surface of another clean coverslip, at an angle of about thirty degrees, thus spreading the blood in a thin film on the second coverslip. There should not be an instant's delay between the operations described in paragraphs 3 and 4. Let the film dry thoroughly.

5. Make three or four such coverslip preparations from each case, place them in the small flat box and fill out the card supplied by the laboratory. Mail both card and box to the laboratory.

A report will be mailed on the day following receipt of the preparations, or a report by telephone may be obtained by calling up telephone City Hall 95, not earlier than 1 P.M. If requested, a telegraphic report will be sent at the physician's expense.

*Card to be filled out by the Physician.*

**FRONT.**

[FORM 33.]

**BOSTON HEALTH DEPARTMENT.**

[To be filled out by the bacteriologist only.]

**MALARIA: Case No.**

**Form**

**Result**

[To be filled out by the physician only. See other side also.]

Date of Taking Blood	Hour	A.M	P.M
Patient's Name	Age	Sex	
Patient's Address			
Date of Earliest Symptoms	Where Contracted		
Has Patient had Malaria before?			
If so, give date of last attack (month and year)			

**BACK.**

[To be filled out by the physician only. See other side also.]

**SYMPTOMS. Chills?**

**Temperature**

**Pulse**

**Tongue**

**Headache?**

**Spleen Enlarged?**

**The preparations were made During a chill: After a chill**

**Was quinine administered before the preparations were made?**

**Clinical Diagnosis**

**Remarks**

**Should this preparation prove negative, do you wish to take another?**

[If answered "yes," a fresh outfit will be mailed with the report.]

**Physician's Name**

**Physician's Address**

[Please fill out both sides of card as indicated, for every preparation made.]

[CIRCULAR NO. 7.]

**DIAGNOSIS OF GLANDERS.**

*Directions for Using Swabs.*

No local antiseptic application should be made to the suspected part for two hours previous to using the swab.

1. Take the glass tube out of the copper box. Withdraw the stopper together with the swab from the glass tube. Hold the swab by the stopper. If nasal lesions be suspected, insert the cotton end into the nostril of the horse and pass it up as far as may be required. Rub the cotton firmly against the suspected mucous membrane, revolving it so that as much as possible of the discharge, pus, mucous, etc., will adhere to the cotton. The cotton should touch nothing at any time except the matter which it is desired to examine.

2. In the case of a suspected farcy ulcer, the swab is rubbed over the surface of the ulcer so as to collect the discharge, and is returned to the tube as described below.

3. The swab may be used also for the diagnosis of farcy buds and various forms of abscess suspected of originating from glanders. On opening up the bud or abscess, the cotton end of the swab is passed into the cavity and returned to the tube as described below.

4. Replace the swab carefully in the glass tube, taking care that none of the matter now adherent to the swab is scraped off on the mouth of the tube. Press the stopper firmly into the mouth of the tube. Replace the glass tube in the copper box.

5. In all cases, fill out the card which accompanies the outfit; replace the card in the copper box, wrapping it around the glass tube, and return the whole outfit, including the card, to the station from which it was obtained, or to the laboratory.

A report will be sent by mail as soon as possible, but owing to the slow development of the diagnostic features of the glanders bacillus, a week will often pass before the report is ready.

*Card to be filled out by the Veterinarian.*

**FRONT.**

[FORM 34.]

**BOSTON HEALTH DEPT.**

[To be filled out by the bacteriologist only.]

**GLANDERS :** Case No.

Received

**D**

[To be filled out by the veterinarian only. See other side also.]

<b>Date of Using Swab</b>	<b>Hour</b>	<b>A.M.</b>	<b>P.M.</b>
<b>Owner's Name</b>			
<b>Owner's Address</b>			
<b>Name or Number of Animal</b>	<b>Age</b>	<b>Sex</b>	
<b>Description (color, etc.)</b>			
<b>Location of Stables (Street and No.)</b>			
<b>Have any cases of Glanders occurred in same stable?</b>			
<b>Date of earliest symptoms of present attack</b>			

**BACK.**

[To be filled out by the veterinarian only. See other side also.]

<b>Is preparation from Nose ?</b>	<b>Abscess ?</b>	<b>Ulcer ?</b>
<b>If from Abscess or Ulcer, state position of same</b>		
<b>Is there nasal discharge ?</b>	<b>From one nostril ?</b>	<b>Both ?</b>
<b>State character of discharge</b>		
<b>Are submaxillary glands enlarged ?</b>		
<b>Is weight of animal decreasing ?</b>		
<b>Temperature</b>		
<b>Clinical diagnosis</b>		
<b>Remarks</b>		
<b>Veterinarian's name</b>		
<b>Veterinarian's address</b>		

[Please fill out both sides of card as indicated, for every preparation made.]



## REPORTS OF MEDICAL INSPECTORS

## REPORT OF THOMAS B. SHEA, M.D.

BOSTON, January 1, 1899.

*To the Board of Health:*

GENTLEMEN, — I have the honor to submit the following report for the year ending December 31, 1898:

During the past year 448 persons dying without a physician in attendance have been reported to this office. In all these cases a personal visit has been made, the body examined and a probable diagnosis made before granting a permit for burial.

Fourteen cases have been reported to the Medical Examiner for investigation. A tabular statement of the cases investigated is appended.

## INFECTIOUS DISEASES.

Twenty-three cases reported as small-pox have been examined, but in no instance was the disease found to exist. One thousand six hundred and sixty-one cases of diphtheria and 877 cases of scarlet fever were reported the past year. Each case has been investigated and a report made whether or not the case was properly isolated.

In many cases isolation was not approved, and these cases were sent to the hospital, and when necessary an order was obtained for a forcible removal.

Respectfully submitted,

THOMAS B. SHEA, M.D.

**Tabular Statement of the Cause of Deaths Investigated by Physician to the Board of Health for the Year ending Dec. 31, 1898.**

DISEASES.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
<b>I. Zymotics.</b>													
Cerebro-spinal fever .....					1	1			1	1			4
Cholera infantum.....					1		5	15	4	1			26
Cholera morbus.....								1					1
Diarrhoea .....								1	1				2
Diphtheria .....												2	2
Measles .....					2		1						3
Scarlatina.....				1									1
Typhoid fever .....										1			1
Whooping-cough .....						1	2	1		1			5
Other Zymotic diseases.....				1							1	1	3
<b>II. Constitutional.</b>													
Cancer .....	1	1	1		1		2	2	2				10
Marasmus .....	2	1	1	1				1			2	2	10
Phthisis pulmonalis.....	1	1	1	1	1		1	4	3	2			15
Tubercular meningitis.....					1		2	2		1			6
Tuberculosis.....	2	1	1	2	3	2	7	4	3	4	2	2	33
Other constitutional diseases.....		1											1
<b>III. Local.</b>													
Apoplexy .....	2	2	1				4	1		2	1	1	14
Appendicitis .....		2											2
Bronchitis .....	1	5	2	2	1	2	1		1	1	2	3	21
Bright's disease.....									1				1
Enteritis .....				2				2			1		5
Gastro-enteritis .....						1	4	2	1	1			9
Heart disease.....	6	2	5	3	11	3	9	6	3	5	8	6	67
Meningitis .....				1						1	1	1	4
Nephritis.....			1	1								1	3
Pneumonia.....	2	1	4	1				1		3	6	3	21
Pleurisy .....								1					1
Other local diseases.....	2	1	1		2		3	2			4	2	17
<i>Carried forward</i> .....	19	18	18	16	24	10	41	46	20	24	28	24	288

STATEMENT OF THE CAUSE OF DEATHS.— *Concluded.*

DISEASES.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
<i>Brought forward.....</i>	19	18	18	16	24	10	41	46	20	24	28	24	288
<b>IV. Developmental.</b>													
Inanition.....	1	....	1	3	1	....	5	3	4	4	2	3	27
Old age.....	2	1	5	1	1	....	1	....	1	4	1	3	20
Premature birth.....	3	4	....	....	2	....	1	1	....	1	....	2	14
Other developmental diseases	....	....	1	....	2	....	....	1	1	1	....	....	6
<b>V. Violent.</b>													
Accidental ....	1	1	....	....	....	....	....	1	....	....	....	1	4
Accidental, overlaid.....	....	....	1	....	1	....	....	1	....	1	....	....	4
Unknown .....	4	3	6	2	3	1	3	4	1	4	4	3	38
Still-births.....	3	6	2	2	....	4	4	1	....	4	5	2	33
Referred to Medical Examiner .....	....	1	....	1	2	1	....	1	2	1	3	2	14
<b>Total .....</b>	<b>33</b>	<b>34</b>	<b>34</b>	<b>25</b>	<b>36</b>	<b>16</b>	<b>55</b>	<b>59</b>	<b>29</b>	<b>44</b>	<b>43</b>	<b>40</b>	<b>448</b>

## REPORT OF GEORGE A. SARGENT, M.D.

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BOSTON, January 1, 1899.*To the Board of Health:*

GENTLEMEN, — I have the honor to submit the following report for the year ending December 31, 1898:

There have been 3,282 persons vaccinated, and 1,283 certificates of vaccination issued.

On Sundays and holidays the City Prison has been visited, and the following diseases and injuries have been treated: Abrasions, contusions, delirium tremens, dislocations, fractures, sprains, incised wounds, lacerated wounds, scalp wounds.

Suffolk County Jail: One thousand three hundred and seventy-eight patients have been treated, requiring 3,411 visits. There have been no deaths at this institution during the past year. A tabular statement is appended.

The City Temporary Home has been visited a number of times, and there have been treated cases of acute bronchitis, chronic bronchitis, adenitis, anæmia, eczema, follicular tonsillitis, measles and phthisis.

Respectfully submitted,

GEORGE A. SARGENT, M.D.,  
*Medical Inspector.*

**Tabular Statement of the Diseases treated at Suffolk County Jail, for the Year ending Dec. 31, 1898.**

DISEASES.	Remaining Jan. 1, 1898.	Treated during year.	Recovered.	Improved.	Sent to Hospital.	Sent to Insane Asylum.	Discharged from custody.	Deaths.	Remaining Dec. 31, 1898.
<b>General Diseases:</b>									
Anæmia .....		3		3					
Debility .....		20		20					
Febricula .....		39	39						
Fever, intermittent .....		2	2						
Marasmus .....		1					1		
Phthisis pulmonalis .....		14		10		4			
Rheumatism, acute .....		4	4						
Rheumatism, chronic .....		46		46					
<b>Functional Diseases of Nervous System:</b>									
Delirium tremens .....		137	137						
Epilepsy .....		2		2					
Neuralgia .....		43	10	33					
<b>Diseases of the Intellect:</b>									
Dementia .....		4				3	1		
<b>Diseases of the Heart:</b>									
Functional Diseases of Heart .....		2	2						
<b>Diseases of Bronchi:</b>									
Asthma .....		2				2			
Bronchitis, acute .....		35	35						
Bronchitis, chronic .....		5		5					
<b>Diseases of Lungs:</b>									
Pleurisy .....		2		1					1
<b>Diseases of Fauces:</b>									
Pharyngitis .....		12	12						
Post Nasal Catarrh .....		3		3					
Tonsillitis, acute .....		2	2						
Tonsillitis, follicular .....		5	5						
<i>Carried forward</i> .....		383	243	123		3	8		1

STATEMENT OF THE DISEASES AT SUFFOLK COUNTY JAIL. — *Continued.*

DISEASES.	Remaining Jan. 1, 1888.	Treated during year.	Recovered.	Improved.	Sent to Hospital.	Sent to Insane Asylum.	Discharged from custody.	Deaths.	Remaining Dec. 31, 1888.
<i>Brought forward</i> .....	383	248	123	....	3	8	....	1	
Diseases of Larynx:									
Laryngitis .....	2	2	....	....	....	....	....	....	
Diseases of Liver:									
Hepatitis .....	1	....	1	....	....	....	....	....	
Diseases of Kidney:									
Nephritis .....	1	....	....	....	....	1	....	....	
Diseases of Bladder:									
Cystitis .....	2	....	....	....	....	2	....	....	
Diseases of Digestive System:									
Colic .....	15	15	....	....	....	....	....	....	
Constipation .....	270	270	....	....	....	....	....	....	
Diarrhœa .....	110	110	....	....	....	....	....	....	
Dyspepsia .....	24	....	24	....	....	....	....	....	
Functional Diseases of Women:									
Menorrhagia .....	3	....	3	....	....	....	....	....	
Metrorrhagia .....	3	....	3	....	....	....	....	....	
Diseases of Cutaneous System:									
Acne .....	2	....	2	....	....	....	....	....	
Callus .....	1	1	....	....	....	....	....	....	
Dermatitis .....	3	3	....	....	....	....	....	....	
Eczema .....	8	....	3	....	....	....	....	....	
Furuncle .....	1	1	....	....	....	....	....	....	
Herpes .....	3	3	....	....	....	....	....	....	
Paronychia .....	4	4	....	....	....	....	....	....	
Phthiriasis .....	35	35	....	....	....	....	....	....	
Scabies .....	10	10	....	....	....	....	....	....	
Verruca .....	2	2	....	....	....	....	....	....	
Diseases of Eye:									
Conjunctivitis .....	20	20	....	....	....	....	....	....	
Poisons:									
Coca habit .....	1	....	....	1	....	....	....	....	
Opium habit .....	13	....	8	....	....	5	....	....	
<i>Carried forward</i> .....	912	724	167	1	3	16	....	1	

STATEMENT OF THE DISEASES AT SUFFOLK COUNTY JAIL. — *Concluded.*

DISEASES.	Remaining Jan. 1, 1888.	Treated during year.	Recovered.	Improved.	Sent to Hospital.	Sent to Insane Asylum.	Discharged from custody.	Deaths.	Remaining Dec. 31, 1888.
<i>Brought forward</i> .....	....	912	724	167	1	3	16	....	1
<b>Surgical diseases:</b>									
Abscess .....	1	10	11	....	....	....	....	....	....
Cellulitis .....	....	1	....	....	1	....	....	....	....
Chancroid .....	....	6	....	6	....	....	....	....	....
Chronic Ulcer .....	....	4	....	4	....	....	....	....	....
Fistula .....	....	2	....	....	....	2	....	....	....
Frost bite.....	....	1	....	....	1	....	....	....	....
Gonorrhœa .....	2	47	22	24	....	....	....	....	3
Hæmorrhoids.....	....	1	....	....	....	1	....	....	....
Hydrocele .....	....	1	....	....	....	1	....	....	....
Leucorrhœa.....	....	6	....	6	....	....	....	....	....
Mastitis .....	....	2	2	....	....	....	....	....	....
Otitis.....	....	4	4	....	....	....	....	....	....
Syphilis .....	3	36	....	37	....	....	....	....	2
Vulvitis .....	....	1	....	....	....	1	....	....	....
<b>Injuries:</b>									
Abrasions .....	....	45	45	....	....	....	....	....	....
Burns .....	....	3	3	....	....	....	....	....	....
Contusions .....	....	18	18	....	....	....	....	....	....
Dislocations .....	....	2	2	....	....	....	....	....	....
Fractures .....	....	4	2	....	....	2	....	....	....
Sprains .....	....	13	13	....	....	....	....	....	....
<b>Wounds:</b>									
Gunshot .....	....	4	2	....	....	2	....	....	....
Incised.....	....	21	15	....	....	6	....	....	....
Lacerated.....	....	28	20	....	....	8	....	....	....
Scalp.....	....	57	43	....	....	9	....	....	....
<b>Total</b> .....	6	1,229	931	244	3	3	48	....	6
<b>Malingering</b> .....	....	143	....	....	....	....	....	....	....
<b>Grand total</b> .....	6	1,372	931	244	3	3	48	....	6

## REPORT OF PORT PHYSICIAN.

February 1, 1899.

*To the Board of Health:*

GENTLEMEN,—I herewith submit the following report of the Quarantine Department for the year ending December 31, 1898:

During the year all vessels from foreign ports, with the exception of the British Maritime Provinces, were inspected; and from June 1 to November 15, all vessels from domestic ports south of Virginia were inspected.

April 12. A case of typhoid was removed from S.S. "Pavonia;" discharged well June 12.

June 3. A case of scarlet fever was removed from same vessel; discharged well June 22.

June 15. A case was removed from ship "Selkirk" for observation; discharged July 6.

June 22. Three cases of scarlet fever were removed from S.S. "Scandinavian;" they were discharged well July 22.

The vessels arriving during the past year were from the following ports:

London . . . . .	179	Singapore . . . . .	2
Liverpool . . . . .	199	Alexandria . . . . .	5
Glasgow . . . . .	27	Azores . . . . .	2
Hamburg . . . . .	14	Australia . . . . .	4
Danzic . . . . .	4	Bermuda . . . . .	2
West Indies . . . . .	192	Mexico . . . . .	22
Coastwise . . . . .	120	Central America . . . . .	24
Antwerp . . . . .	26	Archangel . . . . .	1
Mediterranean Ports . . . . .	20	Hull . . . . .	18
Calcutta . . . . .	3	Bristol . . . . .	24
South America . . . . .	68		
Philippines . . . . .	9		812

Classified as follows:

Steamers . . . . .	601
Schooners . . . . .	125
Barks . . . . .	56
Brigs . . . . .	15
Ships . . . . .	15

---

 812



Vessels of 500 tons and over 691, @ \$8 . . .	\$5,528 00
Vessels of 500 tons and under 121, \$5 . . .	605 00
Board of patients, 17 . . . . .	171 00
Fumigating one vessel, @ \$10 . . . . .	10 00
	<hr/>
	\$6,314 00

In addition to this list eight steamers, four schooners and three brigs, whose papers showed that they had paid fees at other ports, were admitted and no fee charged.

Number of passengers inspected . . .	17,983
Number of cattlemen . . . . .	4,525
Number of seamen . . . . .	22,801

The production of antitoxin was discontinued last April, the horses being turned over to the State Board of Health. Steamer "Vigilant" received new boilers and repairs to hull and machinery. The farm has been well fertilized, and the crops the most abundant in the history of the department.

They are as follows :

Hay, tons . . . . . 18	Beets, bushels . . . . . 70
Potatoes, bushels . . . . 300	Onions, bushels . . . . . 20
Carrots, bushels . . . . 600	Cabbage, heads . . . . . 400
Mango, bushels . . . . . 400	Cucumbers, bushels . . . . 10

and sufficient green vegetables to supply the boat and island during the season. There have been no changes in the personnel of the department.

Respectfully,

PAUL CARSON.

## REPORT OF INSPECTOR OF ANIMALS.

BOSTON, January 1, 1899.

*To the Board of Health :*

GENTLEMEN, — I have the honor to submit the following report of the inspection of animals and dressed meat at the Brighton abattoir, and animals kept for the production of milk within the city, for the year ending December 31, 1898.

## ANIMALS KILLED AT ABATTOIR.

Cattle . . . . .	15,120
Calves . . . . .	19,012
Sheep . . . . .	19,080
Swine . . . . .	976
Total . . . . .	54,138

## ANIMALS CONDEMNED.

	Number.	Weight.
Cows.....	33	9,870 lbs.
Steers.....		
Bulls.....		
Calves.....	1	42 lbs.
Sheep.....	7	352 "
Swine.....	1	222 "
Parts of animals.....		1,100 "
Total.....	42	11,086 lbs.

Many of the smaller animals, as sheep, calves and swine, arrive at the slaughter-houses dead, and are at once prepared for rendering by the owners; such cases are not considered as seizures; and are not included in the table of animals seized and condemned.

"Parts of animals," in the above table, refers to animals where only a part of the same was condemned; the unmarketable portions being confined to the parts about the lesion,

which in these cases are simply of a local condition, as a liver, heart, tongue, and fore or hindquarter of an injured or bruised animal.

Diseases found among animals after having been killed and dressed at the abattoir, necessitating the condemning of the carcasses:

DISEASES.	Cattle.	Calves.	Sheep.	Swine.
Tuberculosis.....	32	.....	.....	.....
Septicæmia.....	1	.....	7	1
Immatured.....	.....	1	.....	.....
Total.....	33	1	7	1

Animals received dead from the stock-yards to be dressed for food:

ANIMALS.	Number Received.	Number Condemned.	Weight.
Cows.....	17	1	230 lbs.
Bulls.....	3	.....	.....
Steers.....	26	.....	.....
Swine.....	1	1	222 lbs.
Total.....	47	2	552 lbs.

The above table refers to animals arriving at the different stock-yards, which, from injury during transportation or from what was supposed to be a slight illness, were unable to walk to the abattoir; these were shot at the stock-yards, and carted to the abattoir in the ambulance.

Of the above forty-seven animals, thirty-five were found to be slightly injured, three were pregnant, two had laminitis, two were wild, and two had septicæmia, the last two being condemned.

#### ACTINOMYCOSIS.

Twelve cases of actinomycosis were found during the past year, all of which were slight, necessitating the condemning of only the parts affected.

## TUBERCULOSIS.

The following table shows the percentage of tuberculosis in cattle killed at the abattoir :

CLASS OF ANIMALS.	Number Received.	Tuberculosis.	Percentage.
Whole number of all kinds.....	15,120	48	0.317
Cows from Eastern States.....	1,506	48	3.187
Bulls from Eastern States.....	267		
Cows from Western States.....	163		
Bulls from Western States.....	29		
Steers from Western States.....	13,145		

Under the head of "Cows from Eastern States" is understood those animals from all of the New England States, including Massachusetts.

In accordance with regulations of the State Board of Cattle Commissioners, monthly reports of the abattoir have been made to that Board.

By comparison of the above table with table under the head of "Diseases found among animals after having been killed, etc.," it will be seen that only thirty-two of the forty-eight cases of tuberculosis were condemned. This means that sixteen of these cases were slight and not condemnable under the act passed by the Legislature of 1898.

Between the years 1894 and 1898, in accordance with the public statutes governing the inspection of animals intended for slaughter, all animals showing any trace of tuberculosis were condemned and the meat destroyed. In the enforcement of the law, large quantities of meat were unnecessarily condemned, which would not have been when the inspector, at the abattoir, in enforcing the regulations of the Board of Health, was supposed to examine each case carefully and use his best judgment.

During the past year the Legislature so amended the acts above referred to, that now only cases showing general lesions are condemned.

## INSPECTION OF CATTLE.

The inspection of cattle kept for the production of milk within the city limits has been continued as heretofore. All cattle that have upon physical examination shown any symptoms of tuberculosis have been subjected to the tuberculin test.

Although the Board of Health has never required the compulsory testing of all cows with tuberculin, when applications have been made at this office by the owners of private animals, such tests have been made without expense to the owner. Such requests have been very few during the past year, due to the fact, it is believed, that the State Board of Cattle Commissioners being without any appropriation, the owner would not be compensated for the animals condemned, as provided for by law.

Nine animals have been tested with tuberculin; six were found tuberculous and were quarantined. These were at once reported to the Board of Cattle Commissioners, which Board, having no appropriation, released these animals immediately. The Board of Health then notified the owners of such animals that the sale of milk from such cows was prohibited, and requested the killing of the animal, which request was in all cases complied with.

The work of inspection and improving the sanitary conditions of milk-rooms has met with considerable success. The order of the Board, passed in the month of December, regulating the sanitary conditions of the general milk supply, will greatly improve the production and care of milk intended for sale in Boston.

#### GLANDERS.

There have been reported by veterinarians to the Board of Health during the past year 147 horses under the suspicion of having glanders. Of these, twenty, on examination, were found to be affected with some other non-contagious disease and the remaining 127 proved to have glanders. Sixteen of these cases, upon inquiry, were found to have been owned and stabled outside of Boston, or had been stabled in Boston for so short a time that no doubt existed but that the animals were infected with glanders before coming to Boston. The cities and towns from which such animals came were notified, thus enabling them to investigate the cases.

In addition to the above cases of glanders reported to this office, the Board of Health, by examination of all animals in stables where a case of glanders has occurred, and also many other stables, have found twenty-six other cases of glanders, all of which would have remained in such stables, a constant danger to the other animals for some time before being discovered by the owner.

All cases of glanders have been reported to the Board of Cattle Commissioners.

Upon examination of the following table it will be seen that the number of cases of glanders reported during the past year is considerably less than during the previous year, when 175 cases were reported. Although the actual number of cases found in the city during the past year is the same as in 1897, this is due to the large number of cases discovered directly by the Board of Health.

The following table shows the number of cases of glanders for each month during the past year:

MONTH.	Cases reported.	Cases found by Board of Health.	Cases found which belonged in some other city.	Cases which upon examination were found not to be glanders.	Actual number of cases of glanders found in city.	Number of cases of glanders which belonged in Boston.	Number of stables in which glanders was found.
January .....	18	1	0	1	18	18	17
February .....	8	2	1	0	10	9	6
March .....	10	8	1	1	12	11	9
April .....	12	1	1	2	11	10	8
May .....	11	5	2	4	12	10	8
June .....	6	1	1	0	7	6	6
July .....	17	2	1	1	18	17	12
August .....	16	5	3	0	21	18	19
September .....	12	1	1	1	12	11	12
October .....	12	2	0	4	10	10	8
November .....	13	3	3	3	13	10	11
December .....	12	0	2	3	9	7	8
Total .....	147	26	16	20	153	137	124

All stables in which glanders have occurred during the past year have been thoroughly disinfected.

In accordance with the suggestion of the Board of Health, the Water Department has caused the public watering-troughs to be washed and thoroughly burned inside and outside with a painter's blast lamp.

During the month of December, glanders' outfits for making swab preparations of suspected cases of glanders were left at the same stations as those in which diphtheria outfits are placed. These outfits consist of a large glass tube containing an absorbent cotton swab, the whole sterilized and placed in a brass tube containing directions for its use.

By this system any veterinarian having a case suspected of glanders may procure an outfit at one of the culture stations, make a swab preparation from the suspected animal, place it in the glass tube, and return the whole to the same culture station, from which it will be sent to the Board of Health laboratory for examination.

Although the examination takes about one week, as it necessitates the injection of other animals with the suspected material, this system should be of the same value and assistance to the veterinarian in making an early diagnosis of cases as the diphtheria culture system is to the physician.

This system has been used for some time by this office, and is now being extended in this way for use by the attending veterinarians.

A copy of the instruction cards (Form 34) used in this system may be seen on page 113 of this report.

#### RABIES.

During the past year four dogs suspected of having rabies have been reported to this office, one of which upon examination proved not to be a case. In addition to the cases reported, one other dog affected with rabies was found by the Board of Health.

December 1, a suspected case of rabies was reported in West Roxbury. This dog upon examination was found dead, having been killed by the owner. The brain of this dog was obtained and sent to the laboratory, where a rabbit was inoculated, which up to the time of writing this report has shown no symptoms of rabies.

December 7, the Board of Health was asked to examine a dog which had been acting very suspiciously the previous few days, and during which time it had bitten a small boy. Upon examination, the dog was found partially paralyzed, and a clinical diagnosis of rabies was made. It was at once placed in a large box and chained. The following morning it was found dead. Another dog belonging to the same owner, and which had been constantly with this dog, was at once killed.

Upon investigation it was learned that the first dog had had periodic attacks of madness lasting about one week, during which it ran wild about the district, biting all other dogs within reach. Fortunately, these attacks lasted but a short time, and the dog returned home in its usual disposition, excepting that it showed continued fretfulness. No history of its having been previously bitten by another dog could be obtained.

Here was a case which called for immediate action, a boy had been bitten, also a large number of dogs. Although the brain of this dog had been sent to the laboratory for diagnosis, action could not be deferred, pending the test which would take fifteen days, and as a result all other dogs suspected of having been in contact with this dog, were at once placed in quarantine upon the owners' premises.

After consultation with the physician who dressed the wound upon the child's hand the parents were informed of the very strong probability of the dog having rabies, and were advised to send the child to the New York Pasteur Institute for treatment. This was done at once, and the child later returned well.

The rabbit inoculated from the suspected rabid dog died in the usual time, and after all other possible causes of death were eliminated by a post-mortem examination, the diagnosis of rabies was confirmed.

Very early in this case the necessity of much better quarantine of the suspected animals was seen. Even if the dog was kept upon the owner's premises, no safety, for the members of the family, or friends calling upon the family, was assured, for while in the house most of the dogs are allowed to run loose.

It was apparent that some municipal quarantine station for dogs, under the directions of the Board of Health, was necessary, to which, at least all dogs not properly secured on the owners' premises, and such other dogs as the Board of Health deemed advisable, could be taken and the public safety from such animals assured.

As a result the Board of Health at once erected a small building upon the epidemic hospital grounds on Swett street, and which is well adapted for the purpose. In this building a number of large kennels were put up; in the rear of each kennel is a separate yard; between each yard is a three-inch space, thus preventing one dog coming in contact with another.

The law at that time gave the Board of Health the right to quarantine only such dogs as were actually infected; although all dogs which were simply exposed to the rabid dog were placed in quarantine by the Board of Health it was known that such quarantine could not be maintained if the owner objected. After the erection of this quarantine station all owners of dogs which had been quarantined were invited to send their animals to this station, but in only three instances did they respond; two of these three were later ordered killed by the owner.



The temporary quarantine of all the dogs, twenty-three in number, was then ordered continued for ninety days.

During the latter part of December a bill was prepared to be presented to the next Legislature, the passage of which seems probable. Under this bill all dogs which have even been exposed to a rabid dog must be properly quarantined upon the owners' premises, or removed to the Board of Health quarantine station.

The laboratory now under the direction of Dr. Hill is prepared to examine all animals suspected of having rabies. It is recommended that all dogs killed, by policemen, owners and other persons, as suspicious or dangerous animals, be sent to the laboratory, where a correct diagnosis may be made.

Respectfully submitted,

ALEXANDER BURR, M.D.V.,

*Inspector and Veterinarian.*

## REPORT OF THE INSPECTOR OF MILK AND VINEGAR.

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BUREAU OF MILK INSPECTION,  
994 WASHINGTON STREET, BOSTON, MASS.

*To the Board of Health, Boston, Mass.:*

GENTLEMEN, — I have the honor to report on the work of the Bureau of Milk Inspection for the year ending January 31, 1899.

The methods employed in the collection and examination of samples have undergone no changes, and the statutes governing the sale and inspection of milk, butter, oleomargarine and vinegar have been in no way amended.

During the year, 13,273 samples of milk were examined. Of these, 7,628 were taken from milk-wagons, 5,308 from shops, restaurants and lunch wagons, and 337 from citizens who brought them to the office for inspection. In spite of the unusually hot and sultry summer the excellence of the supply was well maintained. At one time, however, a very serious form of adulteration, that of addition of preservatives, made its appearance to quite a considerable extent, but radical measures were promptly adopted against it, and the practice ceased as suddenly as it had appeared. It transpired that several agents of a western house had been going about among the milkmen representing that a certain preservative liquid, samples of which were freely given for trial, would make the use of ice unnecessary, keep milk fresh and sweet for several days, and defy detection by chemical analysis. It was even asserted that the Boards of Health of various States were so favorably impressed by its wholesomeness that they even contemplated making its addition to milk not a matter of choice, but one of compulsion. A circular accompanying the free samples stated that the preserving agent was a gas in solution, and further, "This gas has no bad effects on milk or cream; in fact a chemist could not find any trace of it if the milk were analyzed, because the gas evaporates after it has done its work." The bait was taken with eagerness by several dealers after experimentation with a few quarts of milk had demonstrated that treatment was effectual in postponing souring, and it was not long before preserved milk

was pretty generally distributed. Inasmuch as every sample taken was being tested for preservatives, the fraud was immediately detected. Far from being impossible of detection the agent proved to be the preservative, most easily found, namely, formaldehyde. Over fifty complaints were entered at once in the several district courts, and the local market for this most impudent fraud was dead.

The fraudulent sale of oleomargarine has given practically no trouble since the date of the last preceding report. The number of restaurants using it illegally has steadily diminished. In the case of persistent violators who found it cheaper to pay the small fine set by Chap. 412 of the laws of 1891 than to provide butter for their guests, notice was given that in future the complaints would be drawn for selling colored oleomargarine under Chap. 58 of the laws of 1891, which imposes a minimum penalty of one hundred dollars. The introduction of a number of these complaints produced a very marked effect. The number of inspections of butter and oleomargarine during the year was 719.

The samples of vinegar taken or purchased numbered 1,039. Only comparatively few failed to conform to the requirements of the statutes.

#### SUMMARY OF SAMPLES EXAMINED.

Number of samples of milk from milk-wagons . . .	7,628
Number from shops, restaurants and lunch-carts. . .	5,308
Number brought in by citizens for inspection . . .	337
Number of samples of butter and oleomargarine . . .	719
Number of samples of vinegar and cider vinegar . . .	1,039
Total samples . . . . .	15,031

#### SUMMARY OF PROSECUTIONS.

Possession or custody with intent to sell, or sale of milk not of good standard quality . . . . .	121
Possession of milk not of good standard quality and containing formaldehyde, with intent to sell . . . . .	1
Sale of milk not of good standard quality and containing annatto . . . . .	2
Possession of milk containing formaldehyde with intent to sell . . . . .	52
Possession of milk containing borax with intent to sell, . . . . .	3
Possession of milk containing annatto with intent to sell . . . . .	3
Sale of milk by unregistered dealers . . . . .	4
<i>Carried forward</i> . . . . .	186

## HEALTH DEPARTMENT.

133

<i>Brought forward</i> . . . . .	186
Failure to have name and license number on wagon . . . . .	2
Serving oleomargarine without notification . . . . .	14
Sale of oleomargarine colored to resemble butter . . . . .	10
Sale of vinegar not made from cider as cider vinegar . . . . .	15
Sale of adulterated vinegar . . . . .	4
Possession of adulterated cider vinegar with intent to sell . . . . .	9
<b>Total complaints</b> . . . . .	<b>240</b>

## RESULTS OF PROSECUTIONS.

Warrants returned without service . . . . .	7
Cases <i>not pros'd</i> . . . . .	20
Acquittals . . . . .	9
Convictions . . . . .	204
	<b>240</b>

Amount paid in fines . . . . . \$6,585 00

Respectfully submitted,

CHARLES HARRINGTON,

*Inspector.*

## REPORT OF THE INSPECTOR OF PROVISIONS.

*To the Board of Health :*

GENTLEMEN, — I have the honor to submit the following report for the year ending December 31, 1898 :

## MEATS.

Veal, immatured . . . . .	9,761 pounds.
Veal, tainted . . . . .	645 "
Poultry " . . . . .	5,556 "
Beef " . . . . .	1,853 "
Hams " . . . . .	240 "
Pork " . . . . .	220 "
Venison " . . . . .	1,050 "
Bear " . . . . .	600 "
Smoked shoulders . . . . .	380 "
Black ducks . . . . .	40 pairs
Pigeons . . . . .	60 "

## FISH.

Codfish . . . . .	520 pounds.
Haddock . . . . .	325 "
Lobsters . . . . .	139 "
Clams . . . . .	3 barrels.

## FRUITS AND VEGETABLES.

Apples . . . . .	10 barrels.
Beans, 15 crates . . . . .	100 baskets.
Beets . . . . .	1 basket.
Bananas . . . . .	92 bunches.
Blackberries . . . . .	355 quarts.
Cantaloupes, 163 baskets, 188 barrels . . . . .	6,946 crates.
Cucumbers, 5 baskets . . . . .	138 barrels.
Cabbage, 8 crates . . . . .	20 "
Cranberries . . . . .	2,060 quarts.
Egg plant . . . . .	4 barrels.
Grapes, 43 baskets . . . . .	1 barrel.
Peas, 17 crates, 296 baskets . . . . .	8 barrels.
Pears, 43 baskets . . . . .	2 "
Potatoes . . . . .	383 bushels.
Squash, 6 crates, 13 baskets . . . . .	4 barrels.
Spinach . . . . .	7 "
Strawberries . . . . .	1,182 quarts.
Tomatoes . . . . .	104 crates.
Watermelons . . . . .	723

## CANNING AND SAUSAGE FACTORIES.

I am pleased to report that there has been a decided improvement within the past year in the grade of meats and vegetables that are being bought by canning factory agents, and the proprietors of the said factories feel desirous to comply with the admonition of the Board of Health, and to their entire satisfaction special attention has been paid this year to the sausage factories, and with very few exceptions have found no cause to complain of the class of goods that were being used.

## CONVICTIONS.

July 30, 1898.

M. Cagiano. Arrested, convicted and fined five dollars (\$5) for peddling decayed fruit on Saturday night in the market district.

September 10, 1898.

B. Lakin. Arrested, convicted and fined ten dollars (\$10) for offering decayed fruit and vegetables for sale at his place of business after having been duly warned.

## REMARKS.

The Saturday night inspections in the market district are being continued with best results, bringing about a very much greater desire on the part of the provision dealers to comply with the Board of Health's instructions, by offering a better class of goods for sale than in former years. Special attention has been given this year to fruit and vegetables peddled from teams on the street, and after making an example of one or two of these peddlers in court it has produced a very marked improvement in the grade of goods they are now offering for sale.

Steamship and railroad lines are found readily complying with the Board of Health requirements, and have given every assistance in preventing unwholesome goods leaving their wharves or warehouses.

Restaurants that are serving meals at very low prices have not been overlooked in the past year, but attention has been given to the class of meats and vegetables that they have been using. While not always of the first quality of goods in the market they have been found wholesome.

Respectfully submitted,

JOHN C. GROUSE,

*Inspector.*

NORTH GROVE STREET MORGUE.

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BOSTON, January 1, 1899.

*To the Board of Health:*

GENTLEMEN,—I have the honor to report that for the year ending December 31, 1898, there were received at the North Grove Street Morgue 135 bodies of persons deceased, who died in Boston and the northern district of Suffolk County, also the bodies of nineteen deceased persons, found on Cape Cod from the wreck of the Steamship "City of Portland."

Of the above 135 bodies thirty-six were unidentified at time of reception. Of these nineteen were subsequently identified.

Of the nineteen bodies from the wreck sixteen were identified after reception, and every effort made to establish the identity of the other three, which was not done. Every care was given the bodies, and every attention shown the relatives and friends.

The medical examiner and his associate made twenty-eight autopsies, at which I assisted.

The Morgue is at present in very poor condition. The buildings are out of repair. It will necessitate a large expense to put them in good and proper condition. We are sadly in need of new buildings and proper conveniences for our work.

I have the honor to be,

Respectfully,

F. L. BRIGGS,

*Superintendent.*

## REPORT OF SUPERINTENDENT OF PEDLERS.

CITY BUILDING, NORTH GROVE STREET,  
February 1, 1899.

*To the Board of Health :*

GENTLEMEN,— I have the honor to submit the following report of the work performed by this branch of the Health Department for the year ending January 31, 1898 :

Eighty licenses for the collection of bones, grease, etc., were granted.

Eight hundred certificates were issued to pedlers of fruits, provisions and fish, and numbers assigned. (Chap. 43, sect. 86, Revised Ordinances 1892.)

On the first Monday of each month the vehicles and receptacles inspected and numbers approved (Chap. 43, sect. 86) were :

March, 452 ; April, 475 ; May, 470 ; June, 465 ; July, 473 ; August, 480 ; September, 479 ; October, 467 ; November, 453 ; December, 400 ; January, 289.

The City Collector received \$4,441, \$4,025 of which was paid for city licenses.

Complaints were made in court by this branch of the department only by ex-Superintendent John McLoughlin against persons for violating statutes and ordinances relating to pedlers.

The licenses granted during the year were :

Licenses to remove bones, grease, etc. . . . .	80
Numbers assigned by the Board of Health . . . . .	800
Licenses granted by the Secretary of State (city) . . . . .	161
Licenses granted by the Secretary of State (county) . . . . .	104
Licenses granted by the Secretary of State (tax-payers) . . . . .	113

Respectfully submitted,

JACOB BARBER,  
*Assistant Superintendent of Pedlers.*



## APPENDIX.

The following regulations adopted from time to time by the Board of Health are still in force :

## REMOVAL OF MANURE.

May 10, 1875.

*Ordered*, That no manure shall be removed except in a tight, canvas-covered vehicle, with the covering so secured to the sides and ends of the vehicle as to prevent the manure from being dropped or left in any street or way of the city in process of removal, and not loaded in or upon any street, lane, alley or passageway, or upon or across any sidewalk.

## REFUSE.

September 8, 1876.

*Ordered*, That no person removing earth, dirt, sawdust, soot, ashes, shavings, hair, shreds, manure, oysters, clams or lobsters, waste water, or any animal or vegetable substance, house offal, swill, rubbish or filth of any kind whatsoever, shall suffer it to leak, escape or drop from any vehicle by him owned or driven into or upon any street, court, square, lane, alley, wharf or public enclosure in the city of Boston.

## OFFENSIVE TRADES.

August 7, 1878.

*Ordered*, To forbid, after this date, the exercise of the trade or employment of manufacturing fertilizers or guano from fish or other animal matter within the limits of the city of Boston, except on the islands in the harbor, at the abattoir in the Brighton district, or such other places as may have been or may hereafter be assigned by said Board, such trade or employment being in the opinion of the Board a nuisance, hurtful to the inhabitants, the exercise of which is attended by noisome and injurious odors.

## CONTAGIOUS DISEASES.\*

November 21, 1882.

*Whereas*, The diseases designated as small-pox, scarlet fever, diphtheria and typhus fever are contagious and dangerous to the public health, and have been, and may easily be, contracted at funerals from dead bodies or apartments which have been infected by such diseases ; it is, therefore,

*Ordered*, That from and after this date, no public funerals shall be held over the remains of any person having died of small-pox, scarlet fever, diphtheria or typhus fever, without the written permit of the Board of Health ; and under such regulations as may prevent the spread of either of said diseases.

*Ordered*, Further, that the remains of persons dying of either of said diseases shall at once be placed in a tight or sealed coffin, and shall not thereafter be exposed to view or disturbed except for burial.

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\* See page 145.

## Cows.

BOSTON, April 26, 1892.

*Whereas*, Cows' milk is one of the most common and necessary articles of food, and is oftentimes seriously impaired in usefulness and rendered dangerous to health by the want of proper care in its production or subsequent treatment or handling; it is, therefore, ordered that the following regulation be and is hereby adopted:

SECTION 1. No person shall use any building as a stable for cows, unless it contains at least 1,000 cubic feet of space for each animal, is well lighted and ventilated, has tight roof and floors, good drainage, a supply of pure water, and all other necessary means for maintaining the health and good condition of the cows, and has been approved by the Board of Health.

SECT. 2. Every person using any such building shall keep the same and the premises connected therewith, and all land used for pasturage of the cows, clean and free from filth.

SECT. 3. Every person keeping a milch cow shall permit it to be examined from time to time, as to its freedom from disease, by a veterinarian designated by the Board of Health.

SECT. 4. No person having an infectious disease, or having recently been in contact with any such person, shall milk cows or handle cans, measures, or other vessels used for milk intended for sale, or in any way take part or assist in handling milk intended for sale, until all danger of communicating such disease to other persons shall have passed.

SECT. 5. No person shall sell or use for human food the milk of a diseased cow, or permit such milk to be mixed with other milk, nor until it has been boiled, shall sell or use such milk, or any mixture of such milk, for food of swine or other animals.

## RECEPTACLES FOR GARBAGE, ETC.

September 6, 1892.

*Ordered*, That no person unless authorized so to do, be allowed to handle, disturb or remove the contents of any receptacle for garbage or rubbish of any kind placed in the yards, passage-ways or public streets.

## DESTRUCTION OF CLOTHING, ETC.

September 10, 1892.

*Ordered*, That hereafter no articles of clothing or bedding in use shall be thrown overboard from any vessel in Boston harbor without the written consent of the Board of Health or the quarantine physician; nor shall any such articles be removed from any vessel at her dock without such permission; such articles shall no longer be brought to the city to be destroyed, but shall be burned in the harbor under the supervision of the quarantine physician, in the furnaces of the steamers.

## OYSTER SHELLS.

October 17, 1892.

*Whereas*, The storing and handling of oyster shells near business and residential districts are attended by noisome and injurious odors, it is hereby ordered that no oyster shells shall be kept in or removed from any building, yard or other place within the built-up portions of the city, except by written permission from the Board of Health, and only at such times and in such manner as shall be prescribed in said permit.

## QUARANTINE.

March, 4, 1893.

At a meeting of the Board of Health, this day, it was ordered that the several quarantine regulations, now in force at this port, be revised so as to read as follows :

*Ordered*, That any vessel arriving at this port, which has on board at the time of her arrival, or has had during her passage to this port, any sickness of a contagious, infectious, or doubtful character which may be dangerous to the public health, or which has come from or has been in any port or place which has been epidemically infected with any contagious or infectious disease within the six months next preceding such arrival, or has on board any merchandise which has come by transshipment from any such infected port or place within the six months next preceding, or has on board any immigrants (except from British America) shall be anchored at quarantine.

Infected persons found on such vessels shall be removed to the hospital on Gallop's Island, and there detained until all power to infect others shall have ceased. Cargoes and personal baggage, which in the opinion of the Port Physician or the Board of Health may be infected, shall be removed to Gallop's Island and there disinfected, when such disinfection cannot be properly done on board the vessel or on lighters.

All immigrants, on arrival at quarantine, shall be subjected to examination as regards their freedom from contagious or infectious disease and their protection from small-pox.

All persons under ten years of age who have not been successfully vaccinated, and all persons over ten years of age who have not recently been successfully vaccinated or re-vaccinated, shall be considered as unprotected from the effect of the contagion of small-pox, persons having had an attack of small-pox excepted.

All persons not so protected shall be vaccinated or subjected to a quarantine of fifteen days' observation.

All old rags, paper stock, hair, feathers, hides, skins, wool and similar materials which are liable to convey disease germs must be accompanied by satisfactory certificates as to their place of collection and packing for shipment.

No article of clothing or bedding in use shall be thrown overboard from any vessel in Boston Harbor without the written consent of the Board of Health or the Quarantine Physician ; nor

shall any such article be removed from any vessel at her dock without such permission; all such articles which are to be destroyed shall be burned in the harbor under the supervision of the Quarantine Physician, in the furnaces of the steamers.

No vessel shall leave quarantine, nor shall her cargo, or any part thereof, be discharged, nor any person be allowed to go on board or to leave her while in quarantine, without the written permit of the Port Physician, who is hereby authorized and instructed to take such measures with regard to said vessel, cargo, and persons, as, in his judgment, the public health may require.

It is also hereby ordered, that during June, July, August, September and October of each year, subject to such changes as circumstances may from time to time require, all vessels arriving in this harbor from the following ports shall stop at the Quarantine Station, viz.: All vessels from any port in Europe, from the Western, Madeira, Canary, or Cape de Verde Islands; from the Mediterranean or Straits thereof, from the west coast of Africa, or around the Cape of Good Hope; from the West India, Bahama, or Bermuda Islands; from any American port south of Virginia, including Central and South America; and vessels arriving from any place in the United States or British America, where they may have touched on their way from any foreign port or place above named.

No such vessel shall leave quarantine or unload her cargo or any part thereof, nor shall any person go on board or leave the vessel while in quarantine without the written permit of the Port Physician, who is hereby authorized and instructed to take any measures in regard to such vessels, as, in his judgment, the public health may require.

The Port Physician is hereby authorized and instructed to demand and receive the quarantine fees which are hereby made and established by this Board and which are as follows:

For examination of vessels of 500 tons and upwards (registration tonnage), eight dollars.

For examination of vessels under 500 tons (registration tonnage), five dollars.

For disinfecting vessels, from ten to fifty dollars.

For baths and disinfecting personal clothing and baggage, one dollar for each person.

For vaccination, twenty-five cents for each person.

For board of patients in hospital, ten dollars a week.

Such fees to be by the Port Physician paid to the City Treasurer.

#### REFUSE MATERIALS.

March 30, 1893.

*Voted*, That, whereas, in the opinion of the Board of Health, the use of refuse materials in filling ponds and bodies of water and wet lands is a nuisance, source of filth and cause of sickness, it is therefore

*Ordered*, That no person shall throw into any pond or body of water or upon any land which at any time is covered with tide water, within the limits of the city, any refuse animal or vegetable matter or any perishable material or rubbish or filth of any kind whatsoever, between the first day of April and the first day of November, except in accordance with a written permit issued from the Board of Health to the owner of such pond or land, and no owner of such pond or land shall refuse or neglect to remove therefrom any refuse or filth hereinbefore described which shall be thrown or placed in or upon the same within the period hereinbefore specified.

#### FILLING FOR PONDS AND WET LANDS.

April 10, 1893.

*Whereas*, In the opinion of the Board of Health, the use of refuse materials in filling ponds and bodies of water and wet lands is a nuisance, source of filth and cause of sickness, it is therefore ordered that no person shall throw into any pond or body of water, or upon any land which at any time is covered with tide water, within the limits of the city, any refuse animal or vegetable matter or any perishable material or rubbish or filth of any kind whatsoever, between the first day of April and the first day of November, except in accordance with a written permit issued from the Board of Health to the owner of such pond or land, and no owner of such pond or land shall refuse or neglect to remove therefrom any refuse or filth hereinbefore described which shall be thrown or placed in or upon the same within the period hereinbefore specified.

#### TEXAN CATTLE.

July 29, 1893.

*Whereas*, Northern and Western cattle exposed to those coming from Texas, or to the premises which have been used by Texan cattle, are likely to contract a disease known as Texas fever among cattle, it is therefore ordered that none of the cattle arriving from Texas shall be driven over any road or across any lands which are used or liable to be used by other cattle, nor in any way exposed to such other cattle within the limits of Boston, except within the yards immediately connected with the abattoir.

#### STORAGE OF FRUIT.

August 3, 1893.

No person shall store or keep or allow to be stored or kept in any building of which he is the owner or occupant, and which is in use in whole or in part as a dwelling-house, any fruit for merchandise, except in accordance with a written permit from the Board of Health.

## KILLING OF POULTRY.

July 16, 1896.

"That no live chickens, geese, ducks or other fowls, shall be brought into, or kept, or held, or offered for sale, or killed or plucked, in any place in the city of Boston, without a permit therefor in writing from the Board of Health, which shall be subject to revocation by said Board at any time."

## SPITTING IN STREET CARS AND UPON SIDEWALKS.

At a meeting of the Board of Health, March 23, 1899, the regulation dated October 13, 1896, respecting spitting in street cars, was amended so as to read as follows:

"The Board of Health hereby adjudges that the deposit of sputum in public places is a nuisance, source of filth and cause of sickness, and hereby orders: That spitting upon the floor, platform or steps of any railroad, or railway station, car, public building, hall, church, theatre, market or any sidewalk immediately connected with said public places, be, and hereby is, prohibited."

## OFFENSIVE TRADES.

October 13, 1896.

The Board of Health hereby forbids the exercise of the trades or employments of slaughtering animals, rendering animal-matter (except fresh tallow), manufacturing fertilizers, mixing or storing refuse, animal or vegetable substances, smoking fish or meat, refining oils, making varnish, asphaltum, glue, gas, gasoline, or any burning fluid within the limits of the city of Boston, except at such place or places as may be assigned by said Board; such trades or employments being nuisances, hurtful to the inhabitants of said city, dangerous to the public health, attended by noisome and injurious odors, and otherwise injurious to the estates of said inhabitants.

## PEDLERS.

The following laws have been passed for the government of pedlers:

No person shall sell any articles to any person on a public street or go from house to house selling articles, or cry his goods in the street and ways, unless he is a minor, licensed by the Clerk of Committees to sell articles, or he has received a permit from the Superintendent of Streets to sell articles on a public street, recorded his name and place of residence with the Board of Health, and received from said Board a record number.

No such permit or number shall be given to, or used by any person unless the person sells only the following articles, produced or grown in the United States, viz.: Brooms, live animals, fruits, provisions, agricultural products or implements, hand tools used in making boots and shoes, fuel, newspapers, books, pamphlets,

or the products of his own labor or the labor of his family other than jewelry, wines, spirituous liquors, indigo, playing cards or feathers; or the person has received a license as Hawker and Pedler from the Secretary of the Commonwealth *and*—is an honorably discharged soldier or sailor of the late war, *or*—is over seventy years of age, *or*—has paid the City Treasurer twenty-five dollars, *or*—is qualified to vote and has paid a tax on his stock in trade in Boston, *or*—is licensed by said Secretary as a Hawker and Pedler throughout the Commonwealth or throughout the County of Suffolk.

No person selling articles shall refuse or neglect to exhibit his permit, license and certificate whenever the same is demanded by any public officer.

No person shall sell spirituous liquors, wines, jewelry, feathers, playing cards or indigo.

No person shall have in his possession with intent to sell, fish of any kind, unless they are kept in covered stalls or fish-boxes, or in covered carts, well secured from the rays of the sun, nor any fish other than flounders, smelts or other small fish, salmon or shad, unless they have been cleansed of their entrails and other refuse parts.

No person selling articles shall carry them in any vehicle or receptacle, unless the same is neat, clean and free from leaks and has printed upon it his name, the number of his license, and the number given him by the Board of Health, in letters and figures at least two inches in height.

No person selling articles shall carry them in any manner that will injure or annoy the public health or comfort.

No person selling articles shall cry his wares to the disturbance of the peace and comfort of the inhabitants.

No person shall place or permit to remain in any street for more than ten minutes any of his goods or articles without a permit from the Superintendent of Streets.

No person shall, on foot in any street, carry or display any showcard, placard or sign without a permit from the Superintendent of Streets.

No person selling articles shall stop or stand with a cart, wagon, or other vehicle, for the purpose of hawking, peddling, or selling goods, wares, merchandise, fruit or other articles, between the hours of eight o'clock, A.M., and half past six o'clock, P.M., in or occupy any part of, any of the following streets, ways and squares, namely: Haymarket square, Sudbury street, Court street from Sudbury street to Scollay square, Scollay square, Tremont street from Scollay square to Eliot street, Eliot street from Tremont street to Washington street, Washington street from Eliot street to Franklin street, Franklin street from Washington street to Devonshire street, Devonshire street from Franklin street to Milk street, Milk street from Devonshire street to Pearl street, Post Office square, Water street to Washington street, State street between Merchant's row and Devonshire street, and Washington

street from Adams square to Haymarket square, or any of the streets, ways or squares included within the territory bounded as above described, or except in accordance with an order of the Board of Aldermen, stop or stand in, or occupy any part of, any of the streets, ways and squares in the city proper, north of Massachusetts avenue, with a handcart or wheelbarrow for the purpose of hawking, peddling, or selling any goods, wares, or merchandise, fruit or other articles, between the hours of eight o'clock, A.M., and half-past six, P.M.

No person shall sell or expose for sale by public auction any articles except in such place as is expressly described or set forth in his license or permit.

[Public Statutes, ch. 68; 1883, ch. 118 and 168; 1885, ch. 305 and 309; 1887, ch. 422 and 445; 1889, ch. 331 and 457; 1890, ch. 448 and 449; 1891, ch. 144; 1894, ch. 525; Rev. Ord., 1892, ch. 43; Rev. Reg., 1892, ch. 6.]

#### CONTAGIOUS DISEASES.

March 10, 1897.

At a meeting of the Board of Health, this day, it was voted to amend the regulation of July 1, 1895, respecting contagious diseases, so as to read as follows :

1. Whoever is infected with small-pox, scarlet fever, diphtheria or membranous croup shall immediately proceed to some isolated place or room designated by the Board of Health, and no person who has been so affected shall leave such place or room, and no article shall be removed from such place or room, until the Board of Health shall certify in writing that all danger of communicating such disease to others is passed.

2. Every parent or guardian of any child or ward infected with small-pox, scarlet fever, diphtheria or membranous croup shall immediately cause such child or ward to be conveyed to some isolated place or room approved by the Board of Health, and no parent or guardian shall permit such child or ward to remove from such place or room until the Board of Health shall find and certify in writing that all danger of communicating such disease to others has passed.

3. No person other than the attending physician, nurse and agents of the Board of Health shall enter, *nor shall any dog, cat, or other animal be allowed to enter* any apartment or other place set apart for the treatment of small-pox, scarlet fever, diphtheria or membranous croup until the Board of Health shall certify in writing that such apartment or place has been satisfactorily disinfected.

4. No person having the care of any other person who has been affected with small-pox, scarlet fever, diphtheria or membranous croup shall advise or permit such other person to leave any place designated by the Board of Health as a place of isolation of such infected person before said Board of Health shall

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NOTE.—The amendment is shown by the words in italics.



have certified in writing that such person can leave such designated place without danger to others.

5. No physician who has been in attendance upon any person who has been infected with small-pox, scarlet fever, diphtheria or membranous croup, shall advise or knowingly permit such person to leave any place designated by the Board of Health as a place of isolation of such infected person before said Board of Health shall have certified in writing that such infected person can leave such place without danger to others.

#### WALL DRAPERIES.

October 11, 1898.

"The Board of Health hereby adjudges that the use of 'Wall Draperies' at funerals is a source of filth and cause of sickness, and hereby orders: That the use of such draperies in any room or place used for a funeral or for the preparation or retention of any human body before or in connection with such funeral, be and hereby is, forbidden."

#### MILK.

December 22, 1889.

*Whereas*, In the opinion of the Board of Health infectious diseases are spread by the distribution of milk produced, stored and distributed under improper conditions; it is, therefore,

*Ordered*, That the following regulations be, and hereby are, adopted:

#### ARTICLE I.

SECTION 1. All persons in the city of Boston engaged in the production of milk for sale, or in the business of selling, delivering or distributing milk in said city, shall annually on the first day of May, or within thirty days thereafter, make written application to the Inspector of Milk, on forms prescribed by the Board of Health, for a license.

SECT. 2. No person in said city shall engage in the business of producing milk for sale, or in the sale or distribution of milk in the city of Boston, without a license so to do, under these regulations and such other conditions as the Board of Health may impose; said license to be revoked if the licensee fails to comply with the conditions of his license or the regulations of this Board.

SECT. 3. The conditions under which every cow is kept whose milk is brought into the city of Boston, or kept, delivered, distributed, sold or offered for sale in said city, shall be made known by the licensee to the Inspector of Milk in such detail as the Board of Health may require, and shall be approved by said Board; and no milk except that derived from such cow shall be brought, kept, delivered, distributed, sold or offered for sale in said city.

SECT. 4. No milk shall be sold, offered for sale or distributed in the city of Boston unless the cows from which it is derived have, within one year, been examined by a competent authority,

and shown to be free from diseases dangerous to the public health; but this shall not be construed as forbidding the sale or use of milk from cows not tested with tuberculin.

SECT. 5. All persons having a permit or license to sell, deliver or distribute milk in the city of Boston, shall keep a copy of the license constantly posted in a conspicuous place on the premises, and shall have his name and the number of his license marked in plain uncondensed Gothic letters, not less than one inch in height, on vehicles used by him in the conveyance and sale of milk.

#### ARTICLE II.

SECTION 1. No milk for sale or distribution shall be stored in that portion of a building which is used for the stabling of horses, cows or other animals, or for the storing of manure, or in any room used in whole or in part for domestic or sleeping purposes.

SECT. 2. No person in the city of Boston engaged in the business of producing milk for sale, and no person engaged in the business of storing or delivering milk in said city, shall store, cool or mix said milk in any room which is occupied by horses, cows or other animals. All rooms in which milk is stored, cooled or mixed, shall be provided with tight walls and floor and kept constantly clean. The walls and floors of said rooms to be of such a construction as to allow easy and thorough cleansing. The room or rooms aforesaid shall contain proper appliances for washing or sterilizing all utensils actually employed in the storage, sale or distribution of milk, and all such apparatus and utensils shall be washed with boiling water or sterilized by steam regularly after being so used.

SECT. 3. No urinal, water-closet or privy shall be located in the rooms called for in the preceding section, or so situated as to pollute the atmosphere of said rooms.

SECT. 4. All milk produced in the city of Boston for sale shall be strained, cooled or stored as soon as it is drawn from the cow.

#### ARTICLE III.

SECTION 1. Milk kept for sale in any store, shop, restaurant, market, bakery or other establishment, shall always be kept in a covered cooler, box or refrigerator, properly drained and cared for, and while therein shall be kept tightly closed and only in such locations and under such conditions as shall be approved by the Board of Health.

#### ARTICLE IV.

SECTION 1. All cans, bottles or other vessels of any sort, used in the retail sale, delivery or distribution of milk to the consumer, must be cleaned or sterilized before they are again used for the same purpose, and it shall be deemed a sufficient reason for forfeiture of license for any milk dealer to fail so to do.

SECT. 2. No person shall use in any way a milk vessel for any other substance than milk, and any licensed milk dealer who shall so misuse such vessel shall be liable to forfeiture of license.

